THE DIRECTION OF HUMAN EVOLUTION

THE DIRECTION OF HUMAN EVOLUTION

BY

EDWIN GRANT CONKLIN

PROFESSOR OF BIOLOGY IN PRINCETON UNIVERSITY
AUTHOR OF "HEREDITY AND ENVIRONMENT IN THE DEVELOPMENT OF MEN," ETC.

NEW EDITION WITH PREFACE

NEW YORK
CHARLES SCRIBNER'S SONS
1922

Printed in the United States of America

PREFACE TO NEW EDITION

DURING the past few years, and especially within the past twelvemonth, there has been a remarkable recrudescence of the old theological opposition to the theory of evolution, especially as applied to man. In spite of the great amount of evidence which has been accumulating during the past half century with regard to the evolution of man, it is probable that nothing more ignorant, frenzied, or intolerant has ever been uttered against this theory than has appeared during the past year.

No scientific investigator of ten years ago would have thought it possible that the truth or falsity of any scientific theory would ever again be decided by appeals to the Bible, or that an attempt would ever again be made to determine by legislation what might be considered orthodox or heterodox science; and yet this has come to pass. An organization has been perfected among certain religious denominations for the purpose among other things of banishing modernism and particularly the theory of evolution from churches and schools. Its plan of campaign has been outlined in part as follows:

"In order to purify the institutions where mod-

ernism is taught we must discipline and reform these institutions. . . . Our universities, reeking with the unbelief of an evolutionistic false philosophy, are the most dangerous centres in America. . . . Our government has undertaken to regulate business, but the hour has come to regulate our education. . . . The use of the evolutionary hypothesis must be abandoned. . . . The new theology and modernism must be separated from our institutions of learning. . . . This splendid organization could in all probability succeed in cutting off most of the financial support from these institutions, if not in actually bringing about their total destruction." *

Acting upon this last suggestion, bills have been introduced in certain State Legislatures forbidding the teaching of evolution or Darwinism, as applied to man, and in one instance such a bill came within one vote of being passed. Text-books that teach evolution, even as an incidental part of biology or geology, have been condemned and placed on the *index prohibitus* of this new Inquisition, and it is said that funds are being raised to endow and make perpetual this fight against evolution.

All this is done, we are told, to save the religious faith of the younger generation. Apparently the leaders in this movement do not realize that they, and not the evolutionists, are making it impossible

* From *The Christian Century*, April 28, 1921.

for young men and women who are intellectually enlightened to remain in their denominations. It is a dangerous thing for defenders of the faith to affirm, as these do repeatedly, that one cannot be a Christian and an evolutionist at the same time, for students of nature who find themselves compelled by the evidences to accept the truth of evolution will be apt to conclude that they must therefore count themselves as opponents of the churches. The worst form of infidelity is not disbelief in doctrines, whether theological or scientific, but disbelief in the ultimate triumph of truth. If evolution is false, it cannot be saved by science; if it is true, it cannot be destroyed by theology.

In general, the opponents of evolution have neither the technical ability nor even the desire to weigh critically the evidences for the truth of evolution. Properly to appreciate these evidences requires some first-hand knowledge of morphology, physiology, embryology, ecology, paleontology, and genetics. In science it is necessary to see and handle actual materials and processes in order to appreciate their significance, as all who have worked in laboratories know. The advice which Huxley gave to the "paper philosophers" of his day is still good advice: "Get a little first-hand knowledge of biology." But the opponents of evolution not only lack such first-hand knowledge, they usually have no desire to get it second-hand

from those who have studied nature. One of these denouncers of Darwin, when asked if he had ever read his books, replied: "I wouldn't touch them with a ten-foot pole." Neither facts, evidences, nor sweet reasonableness can penetrate such an armor.

With very few exceptions, the whole scientific world long since was convinced of the truth of evolution, and every year which has passed since the publication of the "Origin of Species," in 1859, has added to the mountain of evidence, which has been piled up in its favor. It is fortunately not necessary here to review those evidences, for they may be found in almost every elementary text-book on biology, as well as in hundreds of treatises and scientific journals. These evidences are so numerous and come from so many sources that no intelligent man can study them at first hand and not be convinced of their importance. As a consequence there is probably not a single biological investigator in the world to-day who is not convinced of the truth of evolution. The fact that these evidences accumulate year after year, coming sometimes from fields which Darwin and his contemporaries never dreamed of, is still more convincing. Lord Kelvin, the great physicist, once said that any hypothesis or theory, if true, should find new support continually as knowledge advances. This is just what has happened in the case of evolution.

The opponents of evolution make much of the fact that it is only a theory or an hypothesis, but in this respect evolution does not differ from any other great generalization of science. The evidences for the major transformations in the evolution of man are not personal demonstrations, since they do not fall within the lifetime of a single individual, but they are the same sort of evidences as those for mountain building, stream erosion, glacial action, or any other secular change. Those who urge as an objection to evolution that it is only a theory neglect to say that their own views as to the origin of man can be dignified by no higher title. As between evolution and special creation we have to choose between two theories or hypotheses, and it is merely a question of evidence as to which is the more probable. All the evidence available supports the theory of evolution, it continually receives fresh support from new discoveries, it is not contradicted by any scientific evidence. Can the supporters of the theory of special creation say as much?

Uncertainty among scientists as to the causes of evolution has been interpreted by many non-scientific persons as throwing doubt upon its truth. It is plain that the causes are complex and that they have not yet been fully discovered; it is even probable that some of the proposed causes are erroneous and will have to be abandoned. But

the same may be said with regard to the causes of gravitation, light, electricity, chemical affinity, life, or any other natural phenomenon. It is not fair or honest to quote the doubts of scientists regarding the causes of evolution as if they constituted an abandonment of the theory itself, especially when these same scientists in the same connection affirm that no informed person can doubt the truth of evolution. The fact of evolution is no longer in question among men of science; present uncertainty and doubt concern only the factors or causes. The problem of cause is never finally solved by science, for no sooner is one cause discovered than it gives rise to questions concerning the cause of this cause. Strange as it may seem, it is only with regard to supernatural phenomena that the causes are supposed to be fully known! But, of course, this is due merely to the fact that no attempt is made to analyze such phenomena or causes.

If only the opponents of evolution could learn anything from past attempts to confute science by theology or the Bible, they would be more cautious. Such attempts have promoted neither science nor religion, as the controversies over the shape of the earth, its position in the universe, and its age abundantly demonstrate; and the case is not different with regard to the origin and development of life upon the earth. Scientific investi-

gators and productive scholars have long since accepted evolution in the broadest sense as an established fact. Science now deals with the evolution of the elements, of the stars and solar system, of the earth, of life upon the earth, of various types and species of plants and animals, of the body, mind, and society of man, of science, art, government, education, and religion. In the light of this great generalization all sciences, and especially those which have to do with living things, have made more progress in the last century than in all the previous centuries of human history. Even progressive theology has come to regard evolution as an ally rather than as an enemy. The defenders of religion can only do their cause harm by bringing against this great generalization of science sentimental objections or supposed theological difficulties. The wiser course would seem to be to recognize the fact that scientific truth can be established only by scientific methods, and to attempt to readjust theological beliefs to advancing knowledge.

If the human species, no less than all others, has come into existence by a process of evolution, what are the prospects for the future? May we look forward to endless progress, or do present signs indicate that the human race has reached its climax? Toward what form of social organization is evolution leading? What are the tendencies in the field of ethics and religion?

Certainly no more important questions than these confront the human race, and, although it is impossible to give a final answer to any one of them, it is possible in the light of present tendencies and past principles of evolution to see at least dimly and in ghostly outline the mighty shadows and shapes of the future. It is in this spirit only, and not with the vain imagining that any human being can predict particular events which depend upon so many factors as are involved in the evolution of a race, that attention is invited in this book to the direction of human evolution.

E. G. C.

May 1, 1922.

PREFACE TO FIRST EDITION

THE lectures which constitute this volume were given at the University of North Carolina in May, 1920, under the terms of the "John Calvin McNair Lectureship on the mutual bearings of science and religion upon each other." One or two of them were also delivered at Northwestern University, Mt. Holyoke College, Western University, and the University of Texas.

The topic chosen for this series is one in which the bearings of science upon religion are most vital, namely, the origin and destiny of the human race. I shall attempt to present certain conclusions of science regarding the evolution of man, and shall venture to draw from these conclusions certain inferences with regard to the future of the human race, but I have no desire to force others to accept these conclusions or inferences.

The *spirit* of science is freedom to seek and to find truth, freedom to hold and to teach any view for which there is rational evidence, recognition that natural knowledge is incomplete and subject to revision, and that there is no legitimate compulsion in science except the compulsion of evidence.

The *method* of science is to proceed from observa-

tions to tentative explanations which are then tested by further observations and experiments, thus reaching general explanations or theories. Scientific theories are not mere guesses but are based upon careful, detailed observations, but where time and space forbid entering into details, as is true in these lectures, only general conclusions can be given. On the other hand the philosophical and religious deductions which are based upon scientific theories must necessarily be still more tentative, and it is hoped that the reader will take this for granted even though it is not always expressly stated.

The *aim* of real science, as well as of true religion, is to know the truth, confident that even unwelcome truth is better than cherished error, that the welfare of the human race depends upon the extension and diffusion of knowledge among men, and that truth alone can make us free.

It is not my intention to argue the truth of the general theory of organic evolution; the day for this is passed. Evolution in the widest sense is accepted by most men of science, and the evidences for it need not be recalled here. Nor do I propose to present in detail the evidences for the evolution of man; this has been done in many other places and need not be repeated here. My purpose is rather to consider the course of past evolution only in so far as it bears upon the present and to apply

the principles which have guided evolution in the past to the present and future evolution of the human race. In doing this I hope not only to deal with a phase of the subject which will be more immediately practical and profitable than a mere consideration of past evolution would be, but which also may avoid many controversies, for whatever our views may be as to the past evolution of man there is general belief in the present and future development and evolution of the human race.

Finally, in considering the bearings of evolution upon government and religion, I realize that I am dealing with subjects which are generally regarded as quite outside the field of biology. However, I am convinced that nothing which concerns man is wholly foreign to the fundamental principles of life and evolution, and that the future progress of mankind depends upon a rational application of the principles of science to all human affairs. Everywhere intellectual classes are breaking away from old traditions; everywhere old faiths are being critically examined; everywhere evidence is demanded in place of authority, and the times call for a restatement of the *reasons* for the faith that is in us.

The recent cataclysm which has swept over the world, the perils of civilization, the threatenings of revolution and Bolshevism and the wide-spread recrudescence of emotionalism, irrationalism, and

selfishness have caused all thoughtful people to look anxiously to the future. Many persons believe that our civilization, like other civilizations of the past, is showing signs of degeneration and decay, that throughout the world the less intelligent and more selfish elements of society are coming to control government, industry, and education, while the best elements are dying out or are losing control. Others look forward with alarm to increasing conflicts between the races of mankind, to a "Rising Tide of Color in the Struggle for World Supremacy,"* and to elimination of the finest types in "The Passing of the Great Race." †

Chesterton says that the World War put a stop to all our talk about human evolution, but this is certainly not true. Never before have the problems of the future evolution of man, whether progressive or retrogressive, been so insistent and absorbing, and never before has it been so important for men to get a comprehensive and steady view of human evolution and of human destiny.

Certain portions or abstracts of these lectures have been printed in *Princeton University Lectures*, *Scribner's Magazine*, the *Yale Review*, and the Methodist Church Congress Series. I am indebted to these publications for permission to rewrite and enlarge these portions for this volume. I wish also

*Stoddard, Lothrop, New York, 1920.
†Grant, Madison, New York, 1918.

to express my obligations to Dr. J. H. McGregor of Columbia University for the photograph of his restorations of primitive men, which is reproduced in the frontispiece, and to some of my colleagues for friendly advice and criticism.

E. G. C.

CONTENTS

II. EVOLUTION AND DEMOCRACY

III. EVOLUTION AND RELIGION

I

PATHS AND POSSIBILITIES OF HUMAN EVOLUTION

I

INTRODUCTION

UNTIL about fifty years ago it was generally believed, even by scientists, that man had been recently and miraculously created, and that he stood apart from the rest of nature in solitary grandeur. It was thought that the whole past history of man and even of the earth and stellar universe had been a very brief one, dating back only to about 4,000 years B. C., or approximately 200 human generations, and many persons confidently expected that the future would be even shorter. It is an interesting fact that until very recent times the instability of nature and its approaching end were deeply impressed on most minds. Prophets looked forward to a speedy end of the world; poems were written on "The Last Man"; various sects prepared their ascension robes and waited for the comet to strike the earth or the eternal trumpet to sound; and even those who did not prepare often believed and trembled.

What a revolution has occurred in our conception of man and nature during the past few years! Science has taught us something of the wonderful stability of nature, something of the continuity and eternity of natural processes, something of the

universality of natural law, something of the immensity of time and space. There is no longer any doubt among scientists that man is descended from animal ancestors. There is no longer any serious question among leading biologists and anthropologists that not only the body, but also the mind and society of man are the products of evolution. For a time there was a tendency to admit the truth of evolution so far as man's body was concerned, but to deny it in respect to his mind and society. But this position was satisfactory to no one. Neither the evolutionist nor the special creationist could be satisfied with such a divided origin for man, and more recent work on the psychology and society of different races of men and of animals below man has shown the same sort of evidence for the evolution of human intellect and society as for the evolution of the body. Man, then, in his entirety is regarded by science as the product of evolution. His actual origin goes back not to Adam and Eve and the Garden of Eden, 6,000 years ago, but to more primitive races of men, and then to prehuman ancestors, and in the end to the earliest forms of life upon the earth. Between us and these earliest forms there has been an unbroken line of descent, an uninterrupted stream of life through all the ages.

And this enormously long past history leads us to believe that the future will be equally long. It

has been customary to look upon evolution as a process which flourished mightily "in the dark backward and abysm of time" but which has practically come to an end to-day. But evolution looks forward as well as backward. The eternal laws of nature will not cease to operate to-day or to-morrow. We are creatures of a day; our lives are mere points in the great curve of evolution; what changes the future may have in store for the human race no man can clearly foresee. And yet one who stands on the shore and sees the curve of the sky and sea can, in imagination, extend this arc until it circles the globe, and he feels the earth beneath him rolling through space. From a few observations an astronomer can calculate the whole orbit of a comet and predict when it will return, perhaps hundreds or thousands of years hence. And so, although we catch but glimpses of great processes which come out of eternity and go into eternity, we can project the great principles of past evolution into the future and venture upon a scientific prophecy of "What mankind shall be."

It was the peculiar ability of Darwin to see nature in four dimensions—length, breadth, depth, and *duration*. He observed the activities of earthworms for a season, and then calculated the agricultural and geological importance of worms acting through many years. He observed the minor variations of animals and plants, and then saw the evo-

lutionary significance of such changes when extended throughout geological time. He saw the great destruction of weak and ill-adapted plants and animals each year, and projecting this process backward through the ages found a natural explanation for the wonderful fitness of organisms.

One who stands on the brink of the Grand Cañon and reflects on the duration of time necessary for a stream of water to have cut this vast chasm in the solid rock, and then thinks of the still longer time during which these rocks were being laid down as sediments beneath the sea, has a measuring-rod which may be used in estimating the duration of the evolutionary process. One who views man, not as the creation of a few years ago, but as the product of vast series of prehistoric ages—such a one only can take the long view with regard to the human race, not only as to the past but also as to the future.

There is increased breadth of view and accuracy of judgment and increased confidence and satisfaction in the long view of the human race as contrasted with the short view. One who has in mind the whole course of evolution and of human history will not be deceived into thinking that local eddies and back currents are the main stream. One who recalls what the human race has come up from will not yield to despair over the present crises of civilization. Even the selfishness, stu-

pidity, and irrationality of men will not cause him to forget the advances of the past nor to lose faith in the future. The long view of human history is not only the sane and rational one, but it is also the hopeful view.

It is often said that science deals only with the past and present and leaves the future to prophets and seers. This is true with regard to many details the causes of which are numerous and complex. But on the other hand it is possible to predict general tendencies and phenomena which will result from fundamental principles and causes. The details of the future evolution of man no one can predict, but the outcome of the general principles of evolution may be predicted, for we have confidence that these principles are constant and that they will continue to operate in the future as in the past. What are these principles?

A. The Law of Continuity

"Pour juger de ce qui est arrivé, et même de ce qui arrivera, nous n'avons qu'à examiner ce qui arrive" (Buffon, "Théorie de la Terre.")

"To understand what has happened, and even what will happen, we have only to examine what is happening." This is what has been called the "Law of Continuity"—or more accurately the "Doctrine of Uniformity," namely, the belief that nature is uniform and her processes continuous, that

the laws of cause and effect, of gravity, of conservation of matter and energy, of thermodynamics, chemical affinity, life and death, heredity, development, and evolution are the same yesterday, to-day, and forever. The astronomer, physicist, and chemist believe that laws of gravity, light, electricity, and the combinations and dissociations of chemical elements are the same to-day as when the "morning stars first sang together." The biologist believes that the animals which lived and reproduced on the shores of the Paleozoic seas had protoplasm and cells, nuclei and chromosomes, and that their nutrition, reproduction, embryonic development, senescence, and death were essentially the same as in the animals we now study at our marine laboratories; that the Mendelian laws of inheritance, variation, and evolution applied to the earliest living things as well as to the latest. All science is based upon the fundamental belief that in natural laws "there is neither variableness nor shadow of turning." Variableness in events (not in laws), and even what we call chance, are not capricious but are themselves governed by law; they are merely the results of new combinations of existing factors or causes. We have applied this principle of continuity and uniformity to the past evolution of the universe, to the stars, solar system, and earth, to the evolution of animals and plants, and even of man; and in the light of what is happening now

have been able to judge what has happened in the past. And where the factors involved are not too numerous we can apply this principle to the future and determine what will happen in time to come; and, even where it is not possible to predict with certainty particular events because of the complexity of the factors involved, it is yet possible to determine future tendencies and possibilities.

B. The Principles of Evolution

1. *Evolution Is Trans-formation and Not New-formation*

Evolution consists in new combinations of the elements of which organisms are composed and not in the formation *de novo* of such elements. Nowhere in nature, neither in the living nor in the lifeless world, is there such a thing as creation out of nothing. Every new thing is formed by new combinations of things already present. In chemistry and physics these are the atoms or the electrons of which the atoms are composed; in biology they are the organs, cells, chromosomes, the hereditary characters, inheritance units, or the molecules of which such units are composed. Evolution does not consist in the creation *de novo* of molecules, units, characters, organs, or functions, but rather in new combinations of these.

At the same time it must be recognized that new combinations give rise to new qualities. When

hydrogen and oxygen combine they produce something which is different from either, and when different hereditary units combine they produce characters unlike those of the parents; even in the formation of new hereditary units, or what are now called mutations, we have only new combinations of the elements of which such units are composed. This formation of new qualities as the result of new combinations of the same old elements may be called, following Bergson, "creative evolution," but it is important to remember that it does not differ essentially from the similar phenomenon in chemistry and physics which is known as "creative synthesis," and that it results merely from new combinations, that it is transformation and not new-formation.

2. *Evolution Is Transformation of Germplasm and Not of Developed Bodies of Animals or Plants*

The only living bond between successive generations is found in the germ cells, which extend back from us without a break to our earliest progenitors, and any evolutionary changes which are to transform races or species must take place in these germ cells. The body may undergo great changes as the result of environment, use or disuse, or other causes, but the body is mortal—it develops and dies in each generation—whereas the germ cells are, potentially at least, immortal. Consequently

changes in heredity are due to changes in the immortal germplasm rather than in mortal bodies; and evolution, which is based on changes in heredity, consists in the evolution of germplasm rather than of developed organisms.

In spite of much controversy, due largely to lack of clear thinking, it is now practically certain that characters acquired by the mortal body are not inherited; that is, are not transmitted to the germplasm. Evolutionary changes are not first wrought in developed bodies but in germplasm.

3. *Influence of Environment on Evolution*

All theories as to the causes of evolution agree in ascribing more or less importance to the influence of environment. Lamarckism maintains that changes in individuals are caused directly by changes in environment, and that these individual changes are inherited and thus bring about racial changes. Darwinism teaches that "variations of every sort are caused by changed conditions of life," but that those which are injurious are quickly eliminated while only those which are beneficial, that is, well adapted to environment, persist and constitute the building materials of evolution. The mutation theory of de Vries teaches that variations are of two distinct kinds: first, fluctuations which are changes in the developed organism and are not inherited; and second, mutations which are

changes in the germplasm and are inherited. Fluctuations are caused chiefly if not entirely by changes in environment, and while the causes of mutations are not known with certainty it seems most probable that they also are to be found in environmental influences—meaning by environment everything which surrounds the inheritance units or *genes* of the germplasm. These mutations appear without reference to whether they are valuable or injurious; as a matter of fact probably only one out of a thousand is beneficial, but those which are injurious are eliminated by the environment. Consequently the direction of evolution has to a certain extent been determined by the environmental conditions.

In short, all modern theories of the causes of evolution maintain that heritable variations are probably caused by changes in environment, and all evolutionists to-day believe that whether these variations survive or are wiped out depends upon their relation to environment. Environment thus plays a very important part in evolution, and any hypothesis that wholly discards or disregards this factor can have no standing in science.

But, on the other hand, this does not justify the opinion that environmental changes are the sole causes of evolution. Undoubtedly the organism that is acted upon is as important as the environment which acts upon it. Evolution is one of the

responses of the germplasm to environmental stimuli, and the character of the response is determined in large part by the constitution of the germplasm rather than by the stimulus. Thus both the organism and its surroundings, its hereditary constitution and its environment, are concerned in evolution, as well as in development or any other vital activity. It is certain that the outer environment may act directly upon germ cells, or indirectly through the inner environment of the body. But this does not mean that germ cells react to environment in identically the same way that body cells do; indeed every kind of cell responds to environmental stimuli in its own peculiar way—muscle cells in one way, nerve cells in another, gland cells in still another, and it is probable that different kinds of germ cells, or even the same kinds at different stages in their development, respond to the same environment in different ways.

Inheritance of Acquired Characters.—But, assuming that the hereditary constitution of the germ cells may sometimes be changed by environmental influences, there is no argument in this for the "inheritance of acquired characters." For both verbally and historically this expression means that changes in body cells produced by environmental influences are transmitted through the germ cells to the body cells of the next generation; and analyzing this process further it would imply that par-

ticles or units of the germplasm must react to environmental changes in exactly the same way as organs or parts of the body do. In short, "inheritance of acquired characters" implies that the germ is the body in miniature, and this is certainly not true.

Furthermore, it is known as a matter of fact that acquired characters are not usually, if ever, inherited. Environment, training, education may greatly modify the glands, muscles, and nerves, but they do not change the germplasm so as to produce these identical modifications in the next generation. The hope of permanently improving the human race, or any other species, in this manner can only lead to disappointment and failure.

4. *Social Inheritance*

At the same time it must be remembered that man transmits to his descendants not only a particular germplasm, consisting of hereditary units, which determine his bodily qualities and mental capacities, but he also hands down through language, education, and customs, and not through the germplasm, his own personal acquirements, experiences, and possessions. This may be called "Social Inheritance," though it is a totally different thing from "Biological or Germinal Inheritance." In this sense we have inherited from our parents language, property, customs, laws, institutions.

They are no part of our germplasm, nor even of our bone and sinew and brain, but rather of our environment. Because of this social inheritance society may advance from age to age, each succeeding generation starting where the preceding one ended, as in a relay race—whereas in our germinal inheritance each generation begins where the previous one began, namely from an egg-cell, and the whole course of development must be repeated in each generation.

C. The Results of Evolution

In the course of evolution organisms have moved forward, backward, and sidewise, or rather they have spread as the branches of a tree, some of them merely diverging at the same level of organization, others growing upward, and still others downward. The results of evolution may be summarized in three words: Diversity, Adaptation, Progress.

1. *Diversity*

Diversity is seen in the innumerable variations, mutations, and species of the living world. Most of these are no more complex or perfect than the stocks from which they have sprung, and some of them are degenerate descendants of more perfect ancestors. Diversity, in short, is mere change, whether progressive or retrogressive, whether useful, indifferent, or harmful.

2. *Adaptation*

Adaptive evolution is increasing perfection of adjustment to conditions of life. The only scientific explanation of such adjustment or fitness is Darwin's principle of natural selection of the fit and elimination of the unfit, and it is eloquent testimony to the greatness of Darwin that more and more this great principle is being recognized as the only mechanistic explanation of adaptation. Whether natural selection is a complete explanation of all adaptation may be doubted, but at least it is one of the most important causes of adaptive evolution.

3. *Progress*

Progressive evolution is the advance in organization from the simplest to the most complex organisms, from amœba to man. Biological progress means increasing complexity of structures and functions, increasing specialization and co-operation of the parts and activities of organisms, and human progress, whether physical, intellectual, or social, means no more and no less than this.

It is often assumed that there are no necessary limits to progress in any line, and that the past course of evolution shows that man came from primordial protoplasm and will go on to endless growth and glory. But as a matter of fact the past course of evolution teaches that the limits of progress are fixed by its very nature. No single animal

or plant, however complex it may be, can combine within itself all the complexities of all organisms. Increasing specialization means increasing limitations in certain directions in order to advance in others. If a creature have wings it cannot also have hands (except in art where angels are given an extra pair of appendages and hair and feathers are mixed regardless of zoological classification); if its limbs are differentiated for running they cannot also be specialized for swimming; if it have enormous strength it cannot also have great delicacy of movement. Thus while certain animals are specialized in one direction, and others in another, no animal can be differentiated in all directions.

Furthermore, increasing specialization leads to lack of adaptability; peculiar fitness for any special condition of life means unfitness for other and different conditions. When differentiations in any one direction go so far that they unfit the organism for any condition of life except a single and special one, the chances for survival are greatly reduced, and sooner or later this highly differentiated organism becomes extinct or returns to a more generalized type.

Paleontology is, in the main, the science of organisms that were too highly differentiated to adjust themselves to the new conditions that came upon them and which therefore became extinct. The death of species, like the death of individuals,

is the price that is paid for differentiation. One-celled organisms and all germ cells are potentially immortal, but the highly differentiated bodies of animals and plants and their highly differentiated muscle, nerve, and tissue cells are mortal, probably because they are too highly specialized to adjust themselves to all the changing conditions of existence.

Similarly species that are not highly specialized are highly adaptable, and have great powers of survival, while those that are highly specialized have little adaptability, and consequently are more likely to become extinct. For this reason new paths of evolution usually start from generalized rather than from highly specialized types.

(*a*). *The Paths of Progress.*—Millions of diversities exist among organisms, and they are appearing continually; thousands of adaptations have arisen during the course of evolution and are still arising; but different lines of progress have been relatively few. The most important paths of progress throughout all the past ages have been in the direction of——

(1) *Increasing bodily complexity*, or the multiplication and differentiation of cells, tissues, organs, and systems;

(2) *Increasing intelligence*, or the capacity of profiting by experience, which comes with increasing organization of the nervous system;

(3) *Increasing social organization*, or the differentiation and integrations of individuals or persons, whether among ants, bees, or men.

(*b*). *Progress Most Rapid at First.*—In all these paths of evolution progress is most rapid at first, and it then slows down until it stops. It may be compared to a curve which rises rapidly at first, and then approaches more and more to a straight line. Or better still, it may be compared to a flow of lava which rushes forward while it is at white heat and fresh out of the crater, but goes more and more slowly as it cools until it stops altogether; if the central stream remains fluid (or the organism remains labile and relatively undifferentiated) it may burst out and again flow rapidly in one direction or another until it again cools and stops.

The rate of evolution has not been uniform throughout the past. Apparently there have been periodic advances or waves of evolution. De Vries thinks that there have been periods of mutation alternating with periods of stability in the history of species. Paleontologists have generally attributed these evolutionary waves to changes in environment, and they call attention to the evidence that the periods of most rapid human evolution coincided with the great climatic changes during the four successive glacial epochs and the interglacial periods.

(1) *Bodily Complexity.*—Probably the furthest possible limits of progressive evolution have already been reached in all well-tried lines of progress. Further progress must be made in new lines if at all, and from generalized rather than from highly specialized types.

One-celled organisms reached their utmost limits of complexity millions of years ago; since then they have shown many diversities, many adaptations, but little if any progress.

Also many-celled animals and plants long ago reached the limits of their possible progress in almost every line. Multiplication of cells, tissues, organs, systems, metameres, and zooids enormously increased the possibilities of specialization within each of these larger units of organization, but for millions of years there has been little further progress in this direction of multiplicity and complexity. Only about fourteen times in the whole history of life upon the earth have new animal phyla appeared, and many of these were mere blind alleys which led nowhere, not even to many species; there have been no new phyla since fishes appeared in the Silurian age, no new classes since mammals appeared in the Triassic and birds in the Jurassic. Each of these classes of Vertebrates reached its maximum of complexity in the ages immediately following its first appearance, and thereafter it maintained only this level or more

frequently underwent a decline. The amphibians which first appeared in the Carboniferous reached their greatest complexity in the Permian. The reptiles which first appeared in the Permian reached their climax in the Mesozoic. The mammals which appeared in the Triassic reached their greatest development in the Quaternary.

What is true of great classes of organisms such as those named is equally true of families, genera, and species. One need only recall the paleontological history of dinosaurs, elephants, camels, etc., to realize that, measured by geological time, organisms rather quickly reach the limits of their progress in any particular line. Diversities may continue to appear in all these types. Many new species have evolved and are still appearing, there have been diversifications and adaptation almost without limit, but progress in the sense of increasing complexity of organization has practically come to an end.

(2) *Animal Societies.*—There are many grades of individuality in the living world from the visible and even the invisible parts of cells to whole cells, cell aggregates, tissues, organs, systems, persons, compound animals, and finally colonies and states. There are many grades of organization from the bacterium to the vertebrate, from the germ cell to the man. Animal societies are the highest grade of organization which has yet appeared on earth.

In such societies the specialization and co-operation of *persons* make possible a higher degree of organization than has ever appeared before.

The evolution of animal societies may be traced from a condition in which every individual is much like every other one, and the bond of connection between them is very slight, up to societies of ants, bees, and termites, in which the specialization and co-operation of individuals is extraordinarily developed.

Already differentiation among ants and termites has gone so far that in the most complex colonies the three principal functions of life, namely nutrition, reproduction, and defense, are no longer found in the same individuals; "workers" are unable to reproduce or to defend the colony, males and females are unable to get food or to defend themselves, "soldiers" are unable to reproduce or even to feed themselves. At the same time co-operation within the colony is practically perfect. It is difficult to imagine how differentiation and integration can go farther than this, and unless it does go farther progress in this direction has come to an end.

(3) *Intellectual evolution* is the last, and, from the human point of view, the most important path of progress which has ever been discovered by organisms. In lower animals intellect is either lacking or is but little developed, and behavior is guided entirely by rigid instincts; in higher animals it is

more fully developed, but instinct is still the rule of life; in man only has intellect become to a certain extent the master of instinct, so that he cannot only regulate his conduct in the light of experience but can to a certain extent forecast the future and prepare for it.

Here, as in the case of physical and social evolution, the factors or elements out of which the new product, intellect, is built are present in the lowest and simplest forms of life, but it is only by the increasing differentiation and integration of these elements that progress is achieved. The elements out of which the psychic faculties of man have been developed are present in all organisms, even in germ cells, in the form of sensitivity, tropisms, reflexes, organic memory, "trial and error," and a few other properties; in more complex animals these take the form of special senses, instincts, emotions, associative memory; in the highest animals, and especially in man, they blossom forth as intelligence, reason, will, and consciousness. Many stages of this development may be seen in various animals below man, and also in the development of the human personality from the germ cells.*

There is no evidence that intellectual progress, as distinguished from mere diversity, is still going on among animals, and that they will ultimately

*See Conklin, "Heredity and Environment," 1920, pp. 32–56.

graduate into man's class. For thousands of years man has endeavored to improve by selective breeding the intelligence of certain animals, especially of dogs and horses; undoubtedly much improvement has been made, but in intelligence, as in other qualities, a limit to improvement is sooner or later reached beyond which it is not possible to go.

In bodily complexity, social organization, and intellectual capacity progressive evolution has virtually come to an end among organisms below man; further progress, if it occurs, must be in new paths and from generalized rather than from highly specialized types. Has progressive evolution come to an end in the case of man also?

II

THE PAST EVOLUTION OF MAN

SOLAR years, individual lives, and human generations are too brief to be used as an adequate measuring-rod for the enormously long process of human evolution. We generally count time from the birth of Christ, and to us this seems a remote event. But the birth of Christ is no more than midway between our times and the earliest civilization in Europe,* while the civilizations of Egypt and Mesopotamia go back to a period at least 3,000 years B. C. At this remote time there were in the valleys of the Nile, Euphrates, and Tigris great cities and states, highly organized forms of society, and a culture represented by some of the greatest monuments of human history, highly developed agriculture and industries, the use of metals and the recording of laws, customs, wars, and even of scientific observations in writings. Even one thousand years earlier, at the date fixed upon by Archbishop Usher for the creation of the world and of man, viz., 4000 B. C., there were in these valleys great populations that had domesticated horses, donkeys, cattle, sheep, goats, ducks, and geese; that were cultivating barley, millet, wheat, and flax; that had through

* Crete.

long periods of time developed various improved breeds and races of these animals and plants from their originally wild stocks. They had begun the smelting of ores and the use of copper implements; there were skilled craftsmen in various industries; they had a complicated system of writing and had developed a calendar of twelve months of thirty days each, with five feast days at the end of the year, thus showing a remarkable knowledge of astronomical time. Adam and Eve may well have been civilized human beings, for, according to the Usher chronology, they came only in the fulness of time and of human populations, and after the beginnings of civilization.

But back of this civilization lay long years of barbarism and savagery, known as the neolithic and the paleolithic ages. The records of the former are found in various parts of the world in caves, cliffs, and lake-dwellings, in skeletons from cemeteries, caves, and sedimentary deposits of lakes and rivers, accompanied by bricks and pottery, beautiful stone implements, ornaments of various kinds, and carvings and paintings on walls and cliffs. While it is difficult to date this neolithic age, the best evidence indicates that around the Mediterranean it goes back to near the end of the last glacial epoch, say approximately 10,000 years ago.

Back of this neolithic age lie the paleolithic ages of savagery, the records of which are for the most

part stone implements and weapons; the latest of these are of beautiful workmanship, while the earliest are so crude that it is often difficult to decide whether or not they are the work of man. Along with these artifacts, skeletal remains have been found which indicate that the men of the later paleolithic ages were of the same species and had the chief physical characteristics of the present human species, *Homo sapiens*, and the stratigraphical evidences indicate that in Europe the existing species of man goes back at least 20,000 to 30,000 years.*

In the still more remote past occur skeletal remains of other and more primitive species of man. Most of these are represented by one or at most a few specimens, but one of the extinct species of man, *Homo neanderthalensis*, is represented by at least six skulls as well as other remains found in various parts of western Europe from Gibraltar to Germany. This Neanderthal type was distinctly more ape-like than the present species: he had a low, retreating forehead, heavy supraorbital ridges, protruding jaws and face, and retreating chin. Rude flint implements associated with these remains indicate that the Neanderthal man was able at least to chip flint so as to produce weapons and implements with sharp cutting edges. These

* On this subject see especially Henry Fairfield Osborn's "Men of the Old Stone Age," New York, 1916.

remains are associated with the skeletons of other mammals, many of them now extinct, which characterize the later Pleistocene of Europe, and the prevailing opinion among geologists is that they belong to the period of the third or fourth glacial epoch. It is obviously impossible to translate these geological epochs into years with any degree of certainty, but at a venture it may be said that the Neanderthal race lived somewhere between 25,000 and 100,000 years ago. We do not know whether the Neanderthal species evolved into modern man, or whether he amalgamated with other types, or whether he was exterminated by the existing species, but in western Europe he appeared before the present species and was finally completely replaced by it.

Other types of man of a still more ape-like form are represented by a few skeletal remains in earlier geological formations. One of the most important of these fossils is the famous Heidelberg jaw, found in 1907 near Heidelberg, Germany. It is unlike any other human jaw in its unusual massiveness and lack of a chin, and yet the teeth are distinctly human in shape. There can be no reasonable doubt that it represents a species of man still more primitive and ape-like than the Neanderthal type, and accordingly this species has been named *Homo heidelbergensis*. This jaw was found at a depth of seventy-nine feet below the surface, associated with

remains of many extinct mammals of the first or second interglacial period, and it therefore carries the human record back to the middle or early Pleistocene, possibly 250,000 years ago.

Finally the earliest type of man-like creature so far discovered is the erect ape-man, *Pithecanthropus erectus*, discovered by Dubois at Trinil, Java, in 1892. These remains consist of a skull cap, a tooth, and a thigh-bone, and it is evident that they belong to a type intermediate between man and the higher apes—that they are, in short, one of the long-sought "missing links." The geological formation in which these fossils were found includes many extinct mammals of the late Pliocene or pre-glacial period, possibly 500,000 years ago.

It is by no means certain that Pithecanthropus and the Heidelberg and Neanderthal races stand in the direct line of descent of modern man; for all we know to the contrary they may be collateral branches from the main human stem. But they do represent the most primitive types of man so far discovered.

Even at this early stage, half a million years ago, the human line was already distinct from those of the higher apes, although these lines were then much closer together than at present, and the actual period at which they come together is assumed by Osborn to have been in the Oligocene age, perhaps a million years earlier. If this opinion

is correct the line of man's descent has been distinct from that of his nearest living relatives, the anthropoid apes, for an immensely long period of time, perhaps one or two million years. The entire Christian Era represents not more than 1-50th part of the time since the Neanderthal man flourished, not more than 1-250th of the time since Pithecanthropus, and probably not more than 1-500th part of the time since the human line split off from that of the apes. The human race is very old as measured by our years and generations, and back of the first appearance of human types lie unnumbered millions of years during which evolution was moving on from the lowest forms of life to the highest —from amœba to man.

III

MODERN RACES OF MAN

When for a few centuries one group of human beings became isolated from others there developed, as happens now with most animals and plants, local varieties, mutants, and races, which were probably peculiarly adapted to the local conditions, owing to the struggle for existence and the survival of the fit. Thus, for example, if the color of primitive man was reddish or brownish, white or yellow or black men may have arisen in different regions, and at different times as mutants, or hereditary varieties. These mutations would have persisted if not positively injurious, and they would have gradually replaced individuals of other colors if they had been better adapted to local conditions. Once a few mutant races were established, diversifications of mankind proceeded not only by mutation and natural selection but also by the process of cross-breeding, and the very numerous subraces, types, and breeds of mankind owe their origin in considerable part to such mixtures of mutant races.

The principles of Mendelian inheritance show that for every pair of contrasting characters in the two parents, as for example straight or curly hair,

brown or blue eyes, there are two types of grandchildren showing these characters; when there are five such pairs of contrasting characters in the parents there may be $(2)^5$ or 32 types of grandchildren showing various combinations of these five characters; when there are ten pairs of contrasting characters there may be $(2)^{10}$ or 1,024 types of grandchildren. Between different races there are many more than ten unit differences, and thus with a relatively small number of mutant characters an enormous number of different combinations of the characters is possible in the offspring. Subsequent inbreeding of such a mixed race leads to the separation or segregation of particular types, having certain of these combinations, from other types having other combinations. In this way, practically all of our domestic animals and cultivated plants have been produced, and probably many, if not all, existing branches of the human species owe their origin, not only to mutations, but also to the mingling of successive waves of migration and the amalgamation of different mutant types, which had arisen and multiplied in isolated regions. Since the early radiations from the birthplace of the species there have been many currents of migration running in many directions which have led to a more or less intimate commingling of different types, and where such commingling was later followed by isolation, races or subraces were formed. In this manner,

probably all the numerous existing branches of the human species were established.

Three primary races of mankind are generally recognized in the world to-day, namely the white, yellow, and black races—the brown and red races being generally regarded as offshoots of one or more of these primary races. In addition to these primary races there are many subraces and breeds, most if not all of them being of hybrid origin. Indeed there are few if any types of mankind to-day that are not hybrids between races, subraces, or breeds. Among these subraces are the light and the dark whites, and several types of browns, reds, yellows, and blacks. In each of these groups there are innumerable varieties that run into one another by insensible degrees, as would be expected in the case of hybrids.

The question has often been raised whether the primary races of mankind do not represent distinct species. It is difficult, if not impossible, to define the term "species" in a manner which will be universally acceptable, but in general biologists agree that in the animal and plant world true species differ in more respects and to a greater degree than do the primary races of mankind. Furthermore, true species do not generally produce fertile hybrids when interbred, though there are many exceptions to this rule, whereas all races of mankind produce fertile hybrids when crossed. Therefore systema-

tists generally agree that there is at present but one species of man, namely *Homo sapiens*, and that all races and varieties have arisen in the first instance from a common human stock.

Again the question is often asked: Which of these races of mankind represents most nearly the original ancestral stock, and which has departed farthest from that stock. Comparison of any modern race with the Neanderthal or Heidelberg types shows that all have changed, but probably the negroid races more closely resemble the original stock than the white or yellow races. The separation of these primary races occurred long before the historic era. In the period of the cave men of Europe, possibly 25,000 years ago, remains of two races have been found, the Cro-Magnons, resembling more closely the white or brown races of the present, and the Grimaldi race with negroid characteristics. We do not know when the white and yellow races first became distinct, but this also was probably at a very remote period.

The subraces and minor subdivisions of the human species have arisen much more recently, some of them within the historic era, and many, if not most of them, as the results of migration and hybridization. Three branches of the white race in Europe are generally recognized, namely the tall, blond, *Nordic* race of northern Europe; the stocky, dark, *Alpine* race, probably of Asiatic origin; and

the small, dark, *Mediterranean* race surrounding the sea of that name, and probably extending eastward to India.*

The subdivisions of the other primary races as well as the many hybrid types found in various parts of the world cannot be considered here. But emphasis must be placed upon the fact that the evolution of these subraces was not due entirely to divergent mutations of an originally common stock, but also to recombination and hybridization of groups already present, which probably arose in the first instance as a result of mutation and divergent evolution.

Furthermore it is probable that many characteristics which have hitherto been regarded as hereditary or racial may be due to environmental causes; it is probable, for example, that stature, long-headedness (dolicocephaly) or round-headedness (brachycephaly), etc., may sometimes be caused by higher or lower activity of the thyroid gland and that this may be influenced by food, particularly by the iodine intake.

* For a full discussion of these races see Madison Grant's "The Passing of the Great Race," New York, 1918.

IV

THE PEOPLING OF THE EARTH

MAN has always been a wandering animal; he is the most wide-ranging of all mammals. From his earliest home, probably in the table-lands of central Asia, successive waves of human migration have flowed forth in all directions. The records of these earliest wanderings are lost in the haze of immense antiquity but we have reason to believe that for at least a thousand centuries primitive man wandered over vast regions of Asia, Europe, and Africa. Long before the beginnings of recorded history men had found and occupied every habitable land on the globe with the possible exception of a few distant oceanic islands. Everywhere the "aborigines," who were found by white men in their earliest explorations, were not the first inhabitants, but were invaders who had driven out still earlier peoples. When the Maoris first came to New Zealand, they found an earlier race there, the Morioris, whom they exterminated or drove out to more inhospitable lands such as the Chatham Islands; when the Australian "aborigines" first came to that land they found it already occupied

by another race who retreated before them to Tasmania;* the Polynesian race was preceded in its occupancy of the Pacific Islands by an unknown race which left great monolithic monuments, as in Fiji and in Easter Island; the American Indians were preceded by the "Mound Builders"; and similarly in every part of the world it is difficult to get back to the first human inhabitants. In the thousands of centuries which separate the origin of the earliest human types from the period of written history, mankind had wandered over all parts of the earth.

During this time the surface of the earth itself suffered many changes; portions which are now covered by seas were then dry lands; isolated islands were then connected with continents; four great ice ages separated by interglacial epochs, each lasting for thousands of years, came and went; large portions of the northern hemisphere were at times as inhospitable as central Greenland is to-day and again these regions were covered with forests and luxuriant vegetation and inhabited by strange, extinct animals; and throughout all these changes in the earth's surface and in its living inhabitants, primitive men discovered and occupied practically every habitable portion of the globe.

The total human population of the earth has

*Spencer, W. Baldwin. "Federal Handbook on Australia," 1914.

been estimated* to be about 1,700,000,000, distributed among the different races as follows:

White race about	550,000,000
Yellow race about	500,000,000
Brown race about	450,000,000
Black race about	150,000,000
Red race about	40,000,000

It should be noted that it is customary to count persons of mixed white and colored blood as belonging wholly to the colored races, so that the figures given above rather minimize the white element in the population of the globe.

In general the growth of population is correlated with the area occupied and with the agricultural and industrial development of the people. Where there is much crowding, populations are either stationary or are growing slowly. Where there is a rich and abundant area, the growth of population is usually rapid. Tribes with antisocial or nomadic instincts, such as American Indians, Bedouins, and Gypsies are decreasing under the pressure of population and are destined ultimately to disappear, unless they adopt the habits of more settled peoples.

In China the population is practically at a standstill. It is growing in Japan and overflowing into other countries, but on the whole the yellow race

* Stoddard, Lothrop. "The Rising Tide of Color Against White World Supremacy," New York, 1920, p. 6.

is not increasing very rapidly in numbers. Fecundity is high but so, also, is mortality. In spite of the great area which it occupies the black race is not increasing in numbers in Africa, whereas by immigration and natural increase the white race in that continent is growing rapidly. Even in the United Stated the rate of increase of the blacks is not equal to that of the whites, for although the birth-rate is high, the death-rate is also high.

The white race with about one-third of the total population of the globe occupies four-tenths of the habitable land and has political control over nine-tenths of it.* In the more densely populated portions of Europe the population is approaching a stationary condition, but in the wide areas of America, Africa, and Australasia it is expanding rapidly.

In spite of the occasional alarms which are sounded with regard to "race-suicide" it is evident that the white race is at present increasing more rapidly than any of the other human races. This is due not merely to the larger area which it controls, but also to its greater agricultural, industrial, and scientific development. While the birth-rate is falling everywhere, the death-rate is falling more rapidly among whites than among other races.

How long this greater growth of the white race may go on no one can foresee, but certainly we

* Stoddard, L., *loc. cit.*

may anticipate that it will continue until the relatively unoccupied areas which it now controls are much more densely populated. But in an industrial age it is not so much land area as sources of energy such as coal, oil, and water power that count most. Where these are abundant, there are the "seats of power." Some of these have been rapidly exhausted in the white man's countries and it is believed that great stores of them are found in other lands, especially in China. This undoubtedly betokens a great industrial development in China in the near future and this in turn will lead to a further increase of population in that country.

Most of our "race problems" are of relatively recent origin and are caused chiefly by the pressure of population within certain centres and its overflow into other lands as well as by the importation of cheap labor. The white man in particular has forced himself on other races, and the pressure of whites into the lands of colored races has gone much farther than the reverse. Furthermore, the white man's demand for cheap labor is chiefly responsible for the importation of colored races into the lands of the whites and for the general mixing up of all races of mankind. The present competition between races is a contest in the relative growth of populations and in economic progress rather than in military power.

In all living things populations tend to increase in geometrical ratio, while the limits of the habitable globe remain fixed. Migration may for a time relieve this pressure of overpopulation, but its limits are soon reached. In the case of man the control and utilization of natural resources has greatly extended the possible limits of population, but it is evident that these resources are not indefinite in extent. The whole world must look forward to a time, at no distant date, when the limits of population will be reached everywhere.

In his "Principles of Economics" (8th edition, page 180) Alfred Marshall says:

> Taking the present population of the world at one and a half thousand millions; and assuming that its present rate of increase will continue (about 8 per 1,000 annually; see Ravenstein's paper before the British Association in 1890), we find that in less than 200 years it will amount to six thousand millions, or at the rate of about 200 to the square mile of fairly fertile land. (Ravenstein reckons 28 million square miles of fairly fertile land, and 14 millions of poor grasslands. The first estimate is thought by many to be too high; but allowing for this, if the less fertile land be reckoned in for what it is worth, the result will be about 30 million square miles as assumed above.) Meanwhile there will probably be great improvements in the arts of agriculture; and, if so, the pressure of population on the means of subsistence may be held in check for about 200 years, but not longer.

Pearl* has shown that the growth of population in the United States may be represented very

* Pearl, R. *Proceedings National Academy of Sciences*, June, 1920.

accurately by a long *f*-shaped curve, in which our present population of about 100 millions falls near the middle point, and he predicts that "the maximum population which continental United States, as now arealy limited, will ever have will be roughly twice the present population." He estimates that this maximum will be reached in about 180 years, and that at that date "unless our food habits radically change, or unless our agricultural production radically increases, it will be necessary to import nearly or quite one-half of the calcries necessary for that population."

This is a different story from that which we have been accustomed to hear. No longer is it true that "Uncle Sam has land enough to give us all a farm," and the time is not very far off—only about six human generations—when the death-rate in this country must equal the birth-rate, or our descendants of that date must emigrate. And where will they go? By that time other parts of the world will be much more fully occupied, and other nations may choose to be more careful for their future than we have been for ours. And we thought we had room enough for all the crowded peoples of the earth for all time to come! This country will then have no immigration problem, but for hundreds of years more our descendants will have the racial problems bequeathed to them by us, in order that we might "get rich quick" by importing cheap

foreign labor and by stripping our land of its natural resources as rapidly as possible.

The dangers of overpopulation have been emphasized by many scientists since Malthus published his famous essay on this subject. In general, these warnings have been lightly regarded, owing chiefly to the enormous advances of science in making available natural resources. Many persons seem to think that these advances will go on indefinitely and that therefore populations can increase indefinitely, but this is certainly not true! "The population question," says Huxley, "is the real riddle of the Sphinx, to which no political Œdipus has as yet found the answer. In view of the ravages of the terrible monster, overmultiplication, all other riddles sink into insignificance." *

Nature will, of course, solve this problem for us if we do not solve it for ourselves. Apart from migration there are two ways, and only two, of preventing overpopulation—by increasing the death-rate or decreasing the birth-rate. In all civilized countries the death-rate has been decreasing during the past century, but if overcrowding and underfeeding should occur the death-rate will inevitably increase. In the older and more populous portions of the world the birth-rate has also been decreasing, especially during the past

* Huxley, T. H. "The Natural Inequalities of Men," Collected Essays, New York, p. 328.

two or three generations. In the main this has been due to voluntary causes, and in so far as it represents an intelligent and ethical control of reproduction, and not mere selfishness, it is to be commended. Future ages may see a complete reversal of the current legal aspects of birth-control; in a densely populated globe, instead of discouraging this and forbidding the diffusion of knowledge regarding it, the privilege of having children may be strictly limited. Hitherto evolutionary progress has depended to a large extent upon overpopulation, the struggle for existence and the survival of the fittest. In rational and moral human societies this kind of natural selection can never again be allowed to work as it has done in the past, but possibly overpopulation may bring about a rational solution of this problem along the lines of eugenics and birth-control.

Stoddard has said that the great danger to the white race in this struggle for supremacy is due to the fact that the colored races can *underlive* the whites. But there is no evidence that the absolute requirements of food and clothing differ in different races. The basal metabolism as measured in calories of food is not markedly greater for white men than for yellow or black men living under the same conditions. No doubt the standards of living are at present much higher among white than among colored races. But standards of liv-

ing depend chiefly upon intelligence and resources. Within any and every race there are great individual variations in the standards of living, and among the intelligent and well-to-do of different races these standards do not differ greatly. There are few things which all types of mankind learn more quickly and willingly than to adopt higher standards of living when they have the opportunity, and we may be sure that this will apply to the colored races as well as to the poorer types of whites. One of the great dangers which confronts the whole world is that standards of living, with demands for luxuries and leisure, are increasing much more rapidly than intelligence and social responsibility.

In the long run, supremacy will pass in every community, nation, or race to the more intelligent, the more capable, the more ethical, rather than to the best livers. It is only when high standards of living spring from high standards of intelligence and social ideals that they are not a menace rather than a blessing. Mere love of luxury will sap our civilization as it did that of ancient Greece and Rome, and if it should affect the white race much more than the colored races, then indeed should we have cause to fear for white leadership in the world.

After all, in this struggle of races and peoples, there is reason to believe that success will ulti-

mately rest with the intelligent, the capable, and the ethical, and the attention of all who love their race should be centred upon raising the standards of heredity, of education, and of social ideals rather than upon standards of living. I see no reason to suppose that in these respects the white races will fall below the colored ones. The greatest danger which faces any superior race is that of amalgamation with inferior stock and the consequent lowering of inherited capacities.

V

HYBRIDIZATION OF RACES

EXISTING races have arisen by mutation and hybridization, but they have been established by the *isolation* of certain of these mutants or biotypes. The present tendency to the breaking down of isolation and the commingling of races is a reversal of the processes by which those races were established. If in the past "God made of one blood all nations of men," it is certain that at present there is being made from all nations one blood. By the interbreeding of various races and breeds there has come to be a complicated intermixture of racial characters in almost every human stock, and this process is going on to-day more rapidly and extensively than ever before. Strictly speaking, there are no "pure" lines in any human group. If so-called "pure" English, Irish, Scotch, Dutch, German, Russian, French, Spanish, or Italian lines are traced back only a few generations they are found to include many foreign strains, and this is especially true of American families, even those of "purest" blood.

By this commingling of different lines many new combinations of characters are produced and

some of these combinations may be superior to either parental type, while others may be inferior. In the language of genetics all the offspring of parents of different breeds or strains are "hybrids," though in common usage this term is applied only where the parents belong to different species, subspecies, or races. Mongrels or hybrids are not always inferior to their parents nor are these terms necessarily ones of reproach, as popular usage would indicate. Bateson says that most of the new varieties of cultivated plants are the result of deliberate crossing. This is the process which Burbank has followed with such wonderful success in his experiments. Where two breeds have certain qualities which are desirable and others which are undesirable, it is often possible by crossing them to get a few hybrids in which the good qualities of both breeds are combined and the bad ones eliminated. Many species of domesticated animals and cultivated plants are of hybrid origin; among these are probably dogs, cats, cattle, horses, sheep, pigs, poultry; wheat, oats, rice, plums, cherries, etc.

We are quite accustomed, and more or less reconciled, to the intermingling of European races, but the average white person, at least, is unable to look upon the commingling of blood of the primary races of mankind without serious misgivings as to its effect on the future of the species. Within

certain limits cross-breeding of animals and plants seems to produce increased vigor,* and there is no doubt that highly desirable combinations of the characters of different breeds can thus be made. It is generally believed by Englishmen that the Anglo-Saxon, Anglo-Norman, Norman-French, Scotch-Irish combinations were very good ones, and Americans would point to the good results of the crossing of English, Scotch, Irish, French, Dutch, German, and Scandinavian stocks.

But it is a general belief that the crossing of distinct species or subspecies does not lead to improvement, and it is said that the actual results of the crossing of white, black, and red races in South America, Mexico, and the West Indies, or of brown, yellow, and white races in Polynesia, has not produced a type superior to the best of those that entered into the combination. Stoddard (p. 116) says that "Most informed observers agree that the mixed-bloods of Latin America are distinctly inferior to the whites. This applies to both mestizos and mulattoes, albeit the mestizo (the cross between white and Indian) seems less inferior than the mulatto—the cross between white and black. As for the zambo, the Indian-negro cross, everybody is agreed that it is a very bad one." On this subject he quotes Louis Agassiz as follows:—"Let any one who doubts the evil of

* This has been called in question by King, East, and others.

this mixture of races, and is inclined from mistaken philanthropy to break down all barriers between them, come to Brazil. He cannot deny the deterioration consequent upon the amalgamation of races, more wide-spread here than in any country in the world, and which is rapidly effacing the best qualities of the white man, the negro, and the Indian, leaving a mongrel, nondescript type, deficient in physical and mental energy."

Nevertheless it must be remembered that in most instances the white blood, at least, which entered into these combinations was not of very high quality, and it is hard to avoid the conclusion that Mendelian heredity, which is operative here as everywhere else, will lead to all kinds of combinations—good, bad, and indifferent—even among the offspring of the same parents, and much more among offspring of different parents. It is highly probable that while some of these hybrids may show all the bad qualities of both parents, others may show the good qualities of both and indeed in this respect resemble the children in any pure-bred family. But it is practically certain that the general or average results of the crossing of a superior and an inferior race are to strike a balance somewhere between the two. This is no contradiction of the principles of Mendelian inheritance but rather the application of these principles to a general population. The general effect of the hybridization of races cannot fail to lead to a lower-

ing of the qualities of the higher race and a raising of the qualities of the lower one.

Which are the higher and which the lower races of mankind must depend largely upon the point of view and the qualities under consideration. No race has a monopoly of good or bad qualities; all that can be said is that certain traits are more frequently found in one race than in another.

In love of adventure, of discovery, and of freedom within the limits of social order the white race is probably supreme, and these qualities under favorable environment have led to its great scientific, industrial, and political development. In virility, conservatism, and reverence for social obligations the yellow race, as a whole, is probably superior to the white. If the white race worships liberty, the yellow race deifies duty; if the former is socially centrifugal, the latter is centripetal. The brown, red, and black races each have their characteristic virtues and defects which have become proverbial. Every race has contributed something of value to civilization, though there can be no doubt that the white, yellow, and brown races lead, and probably in the order named.

No doubt if all the good qualities of different races could be combined and all of the bad qualities eliminated the result would be a type greatly superior to any existing race. In domestic animals and cultivated plants such combinations and eliminations are frequently made, and if a higher power

should deal with man as he does with his domesticated animals, no doubt it would be possible to bring about similar results in the human species.

Even if we are horrified by the thought, we cannot hide the fact that all present signs point to an intimate commingling of all existing human types within the next five or ten thousand years at most. Unless we can re-establish geographical isolation of races, we cannot prevent their interbreeding. By rigid laws excluding immigrants of other races, such as they have at present in New Zealand and Australia, it may be possible for a time to maintain the purity of the white race in certain countries, but with the constantly increasing intercommunications between all lands and peoples such artificial barriers will probably prove as ineffectual in the long run as the Great Wall of China. The races of the world are not drawing apart but together, and it needs only the vision that will look ahead a few thousand years to see the blending of all racial currents into a common stream.

What the relative contributions of existing races to this composite race will be is an interesting speculation. Relative viability and fecundity of different races and hybrids as well as psychological affinities and antipathies are important factors in this problem. There is in general much less sentiment for racial purity on the part of colored races than in the case of the white race, and on the part

of white men than of white women, consequently white blood will diffuse more rapidly through colored populations than colored blood through the white. More important still is the fact that for centuries to come Europe, North America, and Australasia will continue to be the centres of the white race; China and Japan of the yellow race; and Africa of the black race, but on the borders around these centres, where the races meet and overlap, there will be miscegenation. In these centres of the white, yellow, and black races we may assume that the populations will for a long time remain predominantly white, yellow, or black, but with increasing infiltration of foreign blood. The longer this segregation can be maintained the larger, other factors being equal, will become the ratio of whites to other races and the greater will be their contribution to the composite race. Every consideration should lead those who believe in the superiority of the white race to strive to preserve its purity and to establish and maintain the segregation of the races, for the longer this is maintained the greater the preponderance of the white race will be, but in the end amalgamation of all races in all parts of the world will probably be as complete as in the case of Greeks, Latins, Saracens, Normans, and Africans in Sicily and Southern Italy.

VI

PRESENT AND FUTURE EVOLUTION OF MAN

A. Physical Evolution

Since the beginnings of recorded history there have been very few and wholly minor evolutionary changes in the body of man. Chief among these are the decreasing size of the little toe and perhaps a corresponding increase in the size of the great toe; decreasing size and strength of the teeth, especially of the wisdom teeth; and probably a general lowering of the perfection of sense-organs.*

These changes are in the main degenerative ones due to the less rigid elimination of physical imperfections under conditions of civilization than in a state of barbarism or savagery. Such changes are insignificant as compared with the enormous changes which led to the evolution of man from prehuman ancestors.

Individual variations due to hybridization or to environmental influences are always present but they have little evolutionary value. By hybridization of various races and stocks there has come to be a complicated intermixture of racial charac-

* See Osborn, H. F. "Contemporary Evolution of Man."

ters; new combinations of characters are thus produced, but new individual characters have not been evolved by hybridization. By changes in environment modifications have been produced in development but not in heredity, these are fluctuations and not mutations.

To a certain extent evolution may be regarded as a response of the organism to environment, whether we have regard to the origin of mutations in the germplasm or to the survival of mutations after they have arisen. But in the case of man the physical environment has probably far less evolutionary value than in lower animals, for by means of intelligence man is able, to a great extent, to control his environment. In cold climates he does not need to grow a thicker coat of hair in order to keep from freezing to death; he can put on or off heavier clothing, as he pleases; he can even change the climate of his residence to suit his needs. Shortage of one kind of food does not compel him to undergo changes of teeth and stomach to fit him to use other foods; he can produce more food of the first kind or can so change and modify new kinds of food that the old digestive system can deal with them. Therefore to the extent that evolution depends upon changing physical environment, man is to a great extent removed from such influences since he can control his environment.

Furthermore the greatest of the directing factors

of evolution, namely natural selection, or the survival of the fittest individuals, has been largely nullified in civilized society. By the most extraordinary efforts we manage to save the weak and deformed in body, the feeble-minded and insane, the evil and antisocial. We are just beginning to realize that intelligent human selection must take the place of natural selection and that the most unfit must be prevented from perpetuating their kind; but is it not evident that the stream cannot rise higher than its source, and that the most that can be expected from such artificial selection is that mankind as a whole shall approach somewhat nearer to the level of the best individuals of the past and present?

Eugenics

Many persons who recognize that human evolution is not progressing favorably look to eugenics, or selective mating, as the best available method of promoting human progress. And there is no doubt that if the same methods which have been applied to the breeding of domestic animals and plants could be applied to man, many important improvements in the human stock could be effected. Chiefly by means of selective breeding, all of the best types of domesticated animals and cultivated plants have been produced, or rather made up and isolated, for the breeder can only wait and watch

for favorable mutations to appear; once they have appeared, he can by appropriate cross-breeding combine these new qualities with other desirable ones, and after he has made up a desirable combination he can, by close inbreeding, perpetuate it and thus produce a new breed or race.

Mutations of many sorts, good, bad, and indifferent, are occurring in the human race, and by cross-breeding good combinations as well as bad ones are produced. Under a system of selective mating comparable to that practised by animal and plant breeders, it would be possible to perpetuate the good combinations and eliminate the bad and thus to improve the human breed, but this would involve such changes in our ideas of monogamy and morality as are scarcely conceivable. And even such a thoroughgoing system of eugenics would not really lead to progressive evolution, with the formation of new characters and the emergence of a new type of man, but only to new combinations of existing characters.

One of the serious difficulties in the way of a really thoroughgoing system of eugenics is the impossibility of determining what combinations are really best and how to bring them about. Until we know vastly more about the genesis of personality than we do now, positive eugenics must be a relatively weak and blundering procedure. It would probably have robbed the world of some of its greatest

men, whose antecedents were most unpromising. The most intelligent eugenicist cannot tell us how to get the best results; he can rarely, if ever, get children of his own that are entirely satisfactory; usually the most that he can do is to tell us how to avoid the worst results. As Huxley says: "The points of a good or bad citizen are really far harder to discern than those of a puppy or a short-horn calf. . . . I sometimes wonder whether people who talk so freely about extirpating the unfit, ever dispassionately consider their own history. Surely one must be very 'fit' indeed not to know of an occasion, or perhaps two, in one's life when it would have been only too easy to qualify for a place among the unfit."*

In all domestic animals and cultivated plants it is found that the breeder can only sort out and recombine the characters which are given; he cannot make new characters or hereditary factors, and consequently he soon reaches the limits of the possible improvement of a breed and must then wait until a new variation or mutation appears. Similarly the eugenicist, even if he could control human breeding as thoroughly as the animal breeder, could not expect to bring about indefinite improvement, but would soon reach a limit in every line beyond which he could not go until a new mutation furnished the material. And even muta-

*Huxley, T. H. "Evolution and Ethics," p. 39.

tions have their limits, beyond which they cannot go without upsetting the entire organic equilibrium.

It is conceivable, though not probable, that the time may come when we may learn how to produce human mutations, possibly how to produce good mutations. If this should ever happen we should have a wonderful opportunity to speed up and control human evolution. But at present this is merely a dream, and there is no likelihood that it will ever be realized. Important, therefore, as eugenics is in bringing about better combinations of hereditary traits, it does not hold forth the promise of endless progress.

From all these points of view it is evident that the conception of unlimited evolutionary progress in any particular line, whether among plants, animals, or men is a mere chimera. In every line of progress a limit is sooner or later reached, beyond which it is not possible to go. Further progress, if it occurs at all, must be in other lines.

For at least one hundred centuries there has been no notable progress in the evolution of the human body. The limits of physical evolution have apparently been reached in the most perfect specimens of mankind. The fact that man is not now evolving rapidly, if at all, is often taken to mean that he was always as he is now, that he never did evolve, but the evidence is all against this. On the other hand, it is said by those who believe in endless prog-

ress that ten thousand years is entirely too brief a time in which to look for marked evolutionary advance, and we are admonished to remember that evolution is slow and that time is long; but, after all, the time available for evolution is not infinite, and ten thousand years representing three or four hundred human generations is quite long enough to reveal any marked tendency in evolution.

There can be no doubt that human evolution has halted, either temporarily or permanently, and when we consider the fact that in every line of evolution progress is most rapid at first and then slows down until it stops, we cannot avoid the suspicion that in those lines in which human evolution has gone farthest and fastest it has practically come to an end. At least we may affirm that there is no prospect that the hand, the eye, or the brain of man will ever be much more complex or perfect than at present. It is, of course, possible that the hand of man might evolve into a more perfect climbing, swimming, or flying organ, but such specialization would unfit it to do the many duties which it now performs and upon which human progress has so largely depended. It is possible that man might develop the telescopic vision of an eagle or the microscopic vision of a fly, but what advantage would there be in such specialization when by means of his inventions he can have both telescopic and microscopic vision far better

than any other creature in the world possesses? It is, of course, possible that the brain of man may undergo further evolution in the future, just as it is possible that the elephant may evolve a longer trunk or the giraffe a longer neck. But the size of the human brain has not increased since the times of the Cro-Magnon race, say 20,000 years ago, and the great prevalence of nervous disorders in the most highly intelligent classes of the present day indicates that the nervous system has already developed to a point where it is getting out of balance with the other vital functions. In every line of progressive evolution there comes a time when specialization can go no farther without interfering with the harmonious interrelation of parts and thus breaking down co-operation.

In most respects man is a generalized rather than a highly specialized type of vertebrate, as is shown by his hands, feet, limbs, teeth, food, digestive system, and sense-organs, and there is no evidence that in the future he will become more highly specialized in these regards; on the contrary, so far as these animal functions are concerned, present tendencies in human evolution seem in the main to be making for a simpler and more generalized organism, as is shown in the simplification of many organs and systems, the progressive degeneration of certain parts, and the presence of many rudimentary structures.

However in the structures and functions of the human brain progressive evolution has gone farther than in the case of any other creature, and this combination of a highly specialized brain with other organs of a more generalized type has been of the greatest advantage in human evolution, for it has made possible at the same time unequalled intelligence and remarkable plasticity and adaptability of bodily functions.

I suppose that from the evolutionary point of view the most perfect type of man would be one in which the brain had reached the highest possible stage of differentiation and in which the rest of the body remained in a relatively generalized condition. H. G. Wells, who was a zoologist before he became a writer of fiction and history, represents the Martians, who are often imagined to have evolved farther than man, as having enormous brains and undifferentiated bodies, little more than generalized protoplasm. But man requires digestive, circulatory, respiratory, and reproductive systems for his survival as well as a nervous system, and if the latter becomes so developed that it destroys the proper balance, all comes to an end. The great increase in nervous and mental disorders and the increasing sterility of the intellectual classes warn us that for the present at least the evolution of the brain and nervous system of man has practically reached its limit.

Metchnikoff* has pointed out many disharmonies or unfitnesses in the human organization affecting digestion, reproduction, and self-preservation; indeed all organs and functions of the human body may show these disharmonies. All of pathology and most of the subject-matter of medicine is concerned with such disharmonies, and they are found not merely in man's bodily structures and functions but also in his mental and social life. Indeed such disharmonies are illustrations of the fact that nowhere in the living world are adaptations perfect or complete, and although the worst failures are quickly eliminated, so that there is a tendency for adaptations to become more and more perfect, yet from a variety of causes, failures of old adaptations continue to occur and new environmental conditions arise to which new adaptations must be made.

While it is true that even the oldest and most complete adaptations are rarely, if ever, ideally perfect, it is especially in the more recent adaptations to new conditions of life that failure of adjustment is most evident. In the case of man there are partial failures of adjustment to even so ancient a condition as the erect posture, and in the case of more recent changes of condition or environment, such as modern food, clothing, housing, and industry, or the parasitic and germ diseases that accom-

* Metchnikoff, E. "The Nature of Man," New York, 1903.

pany civilization and dense populations, such failures or disharmonies are much more evident. If the environment should remain fairly constant, it is probable that the human organism would in time adjust itself to these new conditions. There is evidence of an increasing immunity of civilized races to certain diseases, and in time, if natural selection were allowed to work without interference, it is probable that complete immunity to some of these diseases might become general. But, on the other hand, modern medicine is finding ways to control and even eliminate certain of these diseases in a way much more rapid and less destructive to human life than is natural selection. Here again, as in so many other instances, intelligence is replacing the blind forces of nature, and human evolution is progressing not so much by adaptation of the organism to the environment as of the environment to the organism.

The prolongation of individual human lives by means of medicine, surgery, and general scientific knowledge has led many persons to hope that the present maximum length of life may be greatly extended in the future so that men may once more reach the reputed ages of the patriarchs. But the saving of individual lives has not extended the maximum length of life. The oldest individuals to-day are no older than those of prescientific times. The *average* life of the race has been lengthened chiefly through the reduction of infant mor-

tality. But since it has been proven that longevity is hereditary, it may well be that the artificial prolongation of the lives of the hereditarily weak and short-lived may actually reduce the natural longevity of the race as a whole.

In any event there is no probability that science will greatly extend the present maximum length of life, and there is no basis whatever for the hope which is sometimes expressed that it will ultimately banish death altogether. How fortunate this is will be appreciated when it is recalled that without death and the succession of generations there could be little or no evolution and that under present conditions immortality of the body would be the greatest possible hindrance to human progress.

By eugenics and euthenics the general level of physical development of man may be improved just as it has been in many domestic animals; many diseases may be eliminated and immunity to others may be increased, feeble-bodiedness and feeble-mindedness may disappear and the race as a whole may be made more hardy; but there are no indications that future man will be much more perfect in body than the most perfect individuals of the present, or than the most perfect men and women in the days of Phidias and Praxiteles.

B. Intellectual Evolution

No one can doubt that there has been a wonderful development of intellect throughout the course

of past evolution. Among the vertebrates the class of fishes which came first in the course of evolution is least intelligent, while birds and mammals which came last are most intelligent. And of all orders of mammals the higher Primates, which are the most recent in origin, show the greatest intelligence. Similarly in the case of man, there is abundant evidence that there has been growth of intelligence from the earliest to the latest types and that this development has gone farther in some races than in others.

Furthermore, there is considerable evidence that even in the most intelligent races and individuals there is still much room for intellectual growth; and when we consider the great mass of irrational and emotional mankind, we are impressed with the thought that the race as a whole is just emerging from unreason and that instinct and emotion are still the masters of life.

Surely there is great room for improvement here, but so, also, is there room for intellectual improvement in monkeys and dogs and all other animals below man. The fact that there is room for improvement by no means signifies that improvement will take place. Just as in the case of physical evolution, so here, also, there are limits beyond which intellectual evolution cannot go, and these limits are far short of ideal perfection. The record of the intellectual development of mankind

during the historic period may seem to refute this conclusion and to prove that even if men are not growing more perfect physically they are growing more perfect intellectually. Let us examine somewhat critically this claim.

We certainly know more things than the ancients did, and we are proud to think that

> "The thoughts of men are widened with the process of the suns."

But it is most important to distinguish between knowledge and intellect, between things known and the capacity for knowing.

By means of language, tradition, and writing the experiences of past generations can be handed on to present and future ones, and thus each generation may receive the knowledge accumulated throughout the past. In this sense we are "the heirs of all the ages."

Knowledge is certainly growing, but is intellectual capacity increasing? Does any one think that in the past two or three thousand years there has been any increase in human intellect comparable with the increase in knowledge? Do the best minds of to-day excel the minds of Socrates and Plato and Aristotle? On the contrary, it is the opinion of those who have studied the subject most that no modern race of men is the equal intellectually of the ancient Greek race.

In the two centuries between 500 and 300 B. C. the small and relatively barren country of Attica, with an area and total population about equal to that of the present State of Rhode Island, but with less than one-fifth as many free persons, produced at least 25 illustrious men. Among statesmen and commanders there were: Miltiades, Themistocles, Aristides, Cimon, Pericles, Phocion; among poets, Æschylus, Euripides, Sophocles, Aristophanes; among philosophers and men of science, Socrates, Plato, Aristotle, Demetrius, Theophrastus; among architects and artists, Ictinus, Phidias, Praxiteles, Polygnotus; among historians, Thucydides and Xenophon; among orators, Æschines, Demosthenes, Isocrates, Lysias.

In this small country in the space of two centuries there appeared such a galaxy of illustrious men as has never been found on the whole earth in any two centuries since that time. Galton concludes that the average ability of the Athenian race of that period was, on the lowest estimate, as much greater than that of the English race of the present day as the latter is above that of the African negro.*

There has been no notable progress in the intellectual capacity of man in the past two or three thousand years, and it seems probable that the limits of intellectual evolution have been reached in the greatest minds of the race. Even in the most distant future there may never appear greater geniuses than Socrates, Plato, Aristotle, Shakespeare, Newton, Darwin.

Undoubtedly eugenics and education can do much to raise the intellectual level of the general mass, but they cannot create a new order of in-

* Conklin, "Heredity and Environment," 1920, p. 276.

tellect. Increasing size of brain and complexity of nervous organization lead to mental and physical instability and disharmony, and the great increase in nervous and mental diseases in modern life warns us that there is a limit to intellectual evolution.

The brain has its limits as a storehouse, and it necessarily follows that with knowledge continually increasing and intellectual capacity remaining stationary each individual mind can take in only a small portion of the sum of human knowledge. In this age intellectual specialization is absolutely necessary. There can never again be an Aristotle, nor even a Descartes or Humboldt. Progress in intellectual evolution, no less than in physical, lies in the direction of increasing specialization and co-operation, but this progress is no longer taking place within the individual but in the specialization and co-operation of many individuals. The intellectual evolution of the individual has virtually come to an end, but the intellectual evolution of groups of individuals is only at its beginning.

C. Social Evolution

But if the evolution of the human *individual* has come to an end, certainly the evolution of human *society* has not. In social evolution a new path of progress has been found the end of which no one can foresee.

Evolution has progressed from one-celled organ-

isms to many-celled, from small and simple organisms to larger and more complex ones. By the union of individuals into families and tribes and nations, still larger and more complex units of organization were formed, until now, by intelligent human co-operation, we have governmental units which include hundreds of millions of men, and we are on the eve of bringing together into some form of league or federation all the peoples of the earth.

Three main stages in the past evolution of human culture (the material aspect of which may be defined as knowledge of, and control over, environment) are generally recognized, viz.: Savagery, Barbarism, and Civilization. The lowest stages of human culture, as contrasted with prehuman conditions, begin with the fashioning of crude stone implements and with the use of fire. Middle stages are marked by the making of beautiful stone implements and by the introduction of the use of copper and bronze. The highest stage is characterized by the use of iron, the invention of writing and all that goes with this, and by increasing knowledge of, and control over, the forces of nature. Possibly future historians may record that super-civilization began with the end of wars and the co-operation of all the peoples of the earth. At least there is every evidence that human culture is still advancing and that the end is not yet in sight.

Different civilizations of the past have had their

birth, maturity, and death, and our civilization may possibly follow a similar course, but as generation follows generation, so one civilization gives birth to another. After civilization had once appeared it was never entirely lost from all the earth. It decayed in Egypt and Babylonia, but the torch lighted there was caught up by Phœnicia, Greece, and Rome, and when these went down the flame was passed on to other lands and peoples.

In the whole of this evolution of culture each age or people builds upon preceding ones, and progress has been the result of co-operative effort. Each great advance was due to the discoveries of one, or at most of a few gifted men, but these discoveries could not have been made except for the work which had gone before. Probably the greatest genius of this or of any former age, if thrown entirely upon his own resources without the instruction, experience, or achievements of others to guide and help him, would be unable to invent a phonetic alphabet, to smelt iron ore, to make bronze implements, or even to start a fire by artificial means. Increasing knowledge of, and control over, nature is the result of the labors of countless individuals, the preservation of these results and the handing down of them to successive generations. The individual man has not grown more perfect physically or intellectually, but society has advanced from age to age because it has profited by

experiences of the past. Those who would wipe out present institutions and throw away all the dearly bought experiences of the past would not only destroy the possibilities of progress but they would wreck civilization and reduce man to savagery.

At present social evolution is proceeding at a rate which is amazing if not alarming. All kinds of variations and mutations of the social organization are occurring. Whole nations are making the most stupendous experiments, some of which are bound to end disastrously, but if only we have the intelligence to learn by the experience of others, and the wisdom to preserve the good results of these experiments and to eliminate the bad, social progress will be certain and rapid.

The fact that the evolution of human society and of human inventions has gone forward so rapidly that every one can see the great progress made in his own lifetime, led Samuel Butler* and certain followers of his† to the conclusion that social and intellectual evolution is the cause of physical evolution.

Butler observed that evolution in man does not take place to any important extent in his body but that it is proceeding with great rapidity in the tools, weapons, and machines which man uses and

* Butler, Samuel. "Erewhon," London, 1908.

† Darbishire, A. D. "Introduction to a Biology," New York, 1917.

which are, in his words, "limbs which are loose and lie about detached." Intellect and invention are the motive power in this form of evolution, and he assumes that the same may be true of all evolution, physical and social as well as intellectual. Others maintain that "cell intelligence," which is assumed to be present in all protoplasm, is the cause of all forms of evolution.*

Such a conception not only confuses the different lines of evolution and their causes, but it really denies all the facts and evidences in the case by putting the highest and latest product of the process into its earliest and most elemental stages. It is not a theory of evolution but rather one of involution or creation; it is not a new conception of life and its origin but the oldest known conception.

Dissatisfaction with current views must be great indeed, and the evidence against those views and in favor of the ancient ones must be very convincing to justify such a reaction. And yet almost no evidence is presented against the generally accepted view and in favor of the ancient one. Such essays evidently owe their origin to emotion rather than to reason, to sentiment rather than science; they are based upon desire rather than evidence, and they appeal especially to those who are able to

* Quevli, N. "Cell Intelligence the Cause of Evolution," Minneapolis, 1916.

believe what they desire to believe and who are accustomed to say of evolution, "I *prefer* to trace my origin to the Garden of Eden rather than to a zoological garden,"—as if it were possible for a rational being to believe *anything* he prefers to believe!

De Vries, Morgan, and many others have shown that physical evolution proceeds by sudden changes known as mutations, rather than by minute and continuous variations, and de Vries supposes that there are periods of mutation alternating with periods of relative stability. The present seems to be a mutation period in the evolution of human society. One often hears the expression that certain social changes must come "by evolution or by revolution." But there is such a thing as evolution by revolution, and it seems probable that to-day we are witnessing this process in human society. Whether such evolution is going forward or backward the future only will reveal.

The rapidity of social evolution as contrasted with the slowness of physical evolution is probably due to the fact that changes in germplasm occur much more slowly than changes in habits. In intelligent society past experiences are transmitted to future generations, each generation standing on the shoulders, as it were, of the preceding one, whereas the physical man begins his development anew in each generation from the germ cells, and if he inherits any bodily features acquired by the

experiences of his ancestors—a thing which seems most doubtful—they are very few. On the other hand, individual experiences are more quickly impressed upon the intellect than upon the body or the instincts. Intelligence is a great time-saver, as contrasted with "trial and error." Changes in behavior due to changes in reflexes or instincts are almost, if not quite, as slow as changes in germplasm itself, but changes due to intelligence may take place with "the rapidity of thought"; and where such changes can be transmitted by "social inheritance" to the next generation, as is true of human experiences and learning and institutions, progress is most rapid. In this respect social progress is entirely comparable to ontogeny, or the development of the individual, where each step leads to the next and where every later stage is built directly on an earlier one. Indeed, what we call social evolution in any single race or people is really the individual development or ontogeny of that particular society.

Evolution has progressed from amœba to man; from reflexes to instincts, intelligence, and reason; from the solitary individual to the family, the tribe, the modern state, and, in spite of narrow-minded and reactionary politicians, we or our descendants will yet see the whole human race brought together into a Society of Nations, a "Federation of the World."

Just as there are many disharmonies or failures of adaptation in the human body and mind, so, also, there are many disharmonies in human society. In particular there are the conflicts of the social and antisocial instincts, of selfishness and altruism, justice and injustice, love and hate, peace and war; there is lacking in contemporary society that degree of specialization which would enable each individual to find the work and place where he would be most useful and there is a lamentable failure of co-operation between individuals, classes, nations, and races.

But throughout the course of evolution there has been a continual elimination of the least fit and a survival of the fit, and in the long run we may expect natural selection to lead to the elimination of the antisocial and to the increase of social specialization and co-operation. Indeed, this is no mere matter of faith, but is a process which is going on more rapidly to-day than ever before in human history. The elimination of the socially unfit will ultimately give the world to the fit.

The great goal toward which the human race is moving is the rational organization of society. The societies of ants, bees, and termites; of fishes, birds, and gregarious mammals are based wholly upon instincts, and while some of these societies are extraordinarily perfect, owing to the long and constant action of natural selection, they are rela-

tively inflexible and unfitted to sudden changes of environment. Human society is less perfectly adapted to a particular, narrow environment than that of some social insects, but, thanks to intelligence and the capacity of learning by experience, it is vastly more plastic and perfectible.

The short and narrow view of human society and history is often discouraging and at times it seems desperate, but the long view is more hopeful. The human race has a surprising amount of resiliency and adaptability, it has passed through many terrible crises, many experiments have proved colossal failures, many nations and civilizations have gone down in the wreckage of time, and yet the race survives and society moves forward. Our cherished institutions and social organizations may be only temporary, but the records of social evolution show that the world moves forward and justifies the faith that mankind will ultimately reach the goal of a really rational organization of human society.

D. Man's Conquest of Nature

The evolution of man is no longer limited to his body or mind, nor even to society, but by adding to his own powers the forces of nature, man has entered upon a new path of progress. The differentiations of various members of a colony of ants or bees are limited to their bodies and are fixed and

irreversible; but in human society differentiations are no longer confined to the bodies of individuals but have become, as it were, extra-corporeal.

By this control over nature man has taken into his evolution the whole of his environment. Although he is not as strong as the elephant nor as deft as the spider nor as swift as the antelope nor as powerful in the water as the whale or in the air as the eagle, yet by his control of the forces of nature outside of his body he can excel all animals in strength and delicacy of movement, in speed and power on land, in water, and in air.

This new path of progress is in all respects the most important which has ever been discovered by organisms, and *no one can foresee the end of this process of annexing to our own powers the illimitable forces of the universe.*

VII

WILL THERE BE A HIGHER ANIMAL THAN MAN?

THERE is no probability that a higher animal than man will ever appear on the earth, and the only reason for surmising that other species of the genus Homo may appear in the future is the fact that there have been species in the past which do not exist at present. These prehistoric species have everywhere been replaced by the existing species, perhaps because they were intellectually inferior. It is possible, of course, that similar causes may lead to the elimination of the present species, but this does not seem probable for the following reasons:

(1) All races of man may and do interbreed, owing to fertility *inter se* and to the lack of geographical isolation; consequently there is a growing tendency to the breaking down of racial isolation and to the hybridization of existing races. This is clearly shown in all countries where races, even the most distinct, have been brought together, as in North and South America, the West Indies, Australasia, Polynesia, Asia, and Africa. Such hybridization may possibly lead to the production of new types or mutants, but these would probably

be "swamped" and lost unless they were isolated. All present signs point to an intimate commingling of all existing human types within the next few thousand years at most. The breaking down of geographical and racial isolation will restrict further race differentiation, and this will probably work against the evolution of a still higher race. Even if new races may be developed by psychological or social selection there is no likelihood that new species will thus arise which will supplant the existing species.

(2) The development of moral and social ideals of equal justice for all people will prevent the extermination of inferior races, and democratic ideals of self-government and majority rule will probably prevent even the merciful elimination of all except the most perfect types. The majority cannot be expected to decree its own effacement; the most that can be expected is that the majority will eliminate from reproduction only the most inferior and defective individuals. By this means the standards of the race may be preserved at the present level, but they cannot be greatly advanced. No great improvement in domesticated animals or plants would be possible if breeders were able to eliminate only the most inferior individuals, and the same will certainly be true of human breeds. There is no present indication, therefore, that a new and higher species of man will develop on the earth,

and there is no probability that some other genus or class or phylum may give rise to an animal physically, intellectually, and socially superior to man.

It is possible, but not probable, that the entire human species may become extinct in advance of other higher animals; but even if this should happen, from what other source could a superior animal arise? No other animal approaches man in intellectual capacity, upon which depend the rational organization of society and the conquest of all nature.

However imperfect, irrational, and antisocial mankind may be; however much we may laugh or weep over his simian characteristics and at times sympathize with Mark Twain's comments on "the damned human race," we may feel confident that in the long ages of future evolution no other greatly superior animal will appear upon this planet. If a superior species is to appear it must come from human stock.

II

EVOLUTION AND DEMOCRACY

I

THE BIOLOGICAL FOUNDATIONS OF SOCIETY

A. Physical, Intellectual, Social Evolution not Antagonistic

Evolution has proceeded along many lines and not along a single one; it is best represented, not by a ladder or scale but by a branching tree in which growth has ceased in certain branches but is still going on in others, and while many branches grow upward, some turn down. In one case it is progressive and in another retrogressive, in one case it leads to increased and in another to decreased size and complexity of structure; in one case to physical strength and combativeness, in another to weakness, cunning, and concealment. In man there have been three main lines of evolution—physical, intellectual, social. The fundamental causes of progress may be the same in all of these lines; it may be, for example, the survival of the fittest, but the standards of fitness are different in the three. Physically, the fittest is the most viable; intellectually, the fittest is the most rational; socially, the fittest is the most ethical.

These three standards are often in conflict, they are always balanced against one another, but they are not mutually exclusive; all three may, and do, coexist in such a way that each strengthens the other. In his famous Romanes Lectures on "Evolution and Ethics," Huxley says:* "Let us understand, once for all, that the ethical progress of society depends, not on imitating the cosmic process, still less in running away from it, but in combating it." But I fancy that even in Huxley's thought the combat between ethical progress and the struggle for physical existence consisted in keeping this struggle within certain bounds rather than in eliminating it altogether. The progress of mankind involves the preservation of a proper balance between physical, intellectual, and social fitness; no one of these must go so far as to harm or destroy either of the others. Least of all is there any justification for the views of Bernhardi and other biological militarists, that the most powerful, domineering, and combative are the fittest socially. We know as a certainty that this is not the case, and that such ideas would lead to the utter destruction of society. Mankind may have lost something in physical fitness by curbing "Nature red in tooth and claw," but it has gained immeasurably through the establishment of society, which would have been impossible with unlimited struggle for exist-

* "Evolution and Ethics," p. 83.

ence between individuals, classes, and nations. Darwin himself, long ago, protested against this mistaken application of natural selection to society and showed that in social evolution the most ethical is the most fit.*

But while these different lines of evolution are not necessarily antagonistic it is important to remember that all life processes, including evolution, are balanced, as it were, between contending forces and principles. Life itself, as well as evolution, is a continual adjustment of internal to external conditions, a balance between constructive and destructive processes, a combination of differentiation and integration, of variation and inheritance, a compromise between the needs of the individual and those of the species. And in addition to these conflicting relations we find in man the opposition of instinct and intelligence, emotion and reason, selfishness and altruism, individual freedom and social obligation. Progress is the product of the harmonious correlation of organism and environment, specialization and co-operation, instinct and intelligence, liberty and duty.

In short it is impossible for man to make real and lasting progress by destroying the balance which exists between these three lines of evolution.

* In a letter to Wallace he says that "the struggle between the races of man depended entirely on intellectual and moral qualities" ("More Letters of Charles Darwin," vol. II, p. 33).

Here, as everywhere else in the world of living things, such progress consists in maintaining a proper balance between many desirable ends.

B. Social Progress Means Greater Specialization and Co-operation

Organization, whether physical, intellectual, or social, means differentiation and integration, specialization and co-operation, diversity and harmony. Progressive evolution invariably and inevitably means increasing differentiation and integration. In the long history of life upon the earth, organisms have varied in every possible way; they may be said to have made millions and millions of experiments in finding the path of progressive evolution, and in every instance this path has been in the direction of greater specialization and co-operation. One-celled organisms, in which the greatest amount of individual liberty is preserved to the separate cells, have undergone but little progressive evolution and have remained in practically the same stage of organization for millions of years. Many-celled organisms, on the other hand, have undergone the most varied and extensive evolution; and this has been due to the fact that the specialization of single cells and their co-operation in the work of the organism as a whole has made possible the highest types of organisms.

In a similar way one may trace the evolution of animal societies from a condition in which extreme individualism prevails up to societies of ants, bees, and termites in which the specialization of individuals is higher, the mutual dependence more complete, and the work which the colony is able to perform is immensely greater and more perfect than could be accomplished by any number of individuals working separately. What the individual cannot do because of lack of strength or specialization or time, the social group can accomplish with the strength and specialization of all and through long periods of time.

What is true of insects in this respect is also true of men. It matters not that in the one case activities are governed by instinct alone and in the other by intelligence as well as instinct; the final result, the biological ideal, is the same, whether the advantages of higher organization have been discovered by natural selection or by intelligence. If human society is to be something more than an aggregation of individuals, if it is to accomplish more than can be performed by separate persons, it must be through higher and higher organization, that is through greater specialization and more complete co-operation. There is no doubt that the evolution of human society has been in this direction, and the entire past history of living things indicates that further progress of society must be along this line.

C. Society Founded on Instincts

The integrating factors in all animal societies are instincts rather than intelligence. That this is true of ants, bees, and wasps, of fishes, birds, wolves, and sheep no one will question. That it is equally true of human society is plainly apparent to any one who studies primitive man or who analyzes the behavior of even the highest races. Even in man, instinct is more universal and more powerful than reason; indeed, reason plays a relatively small part in the lives and activities of most men. The contrary opinion is due to our inveterate habit of acting instinctively and then attempting to explain to ourselves or to others the *reason* for the act. Indeed, mankind, as a whole, has but recently begun to emerge from a life of instinct to one of intelligence and reason.* Some races and some individuals have gone farther in this direction than others, but with the great mass of mankind instinct is still the guide of life.

Descartes begins his famous "Discourse on Method" with these words: "Good sense or reason is, of all things among men, the most equally distributed." No modern philosopher or scientist would agree to this; on the contrary, he would say: "Instinct is, of all psychical things among men, the

* On the transition from instinct to intelligence and reason, see Conklin, "Heredity and Environment," pp. 43–49.

most equally distributed." Instinct and not reason is the source and ultimate cause of human society as well as of most human behavior.

The principal instincts of all animals are those which concern safety, food, and reproduction; the most important social instincts have to do with the defense, welfare, and perpetuity of the group. In addition to these general instincts the following more special ones have served to bind the higher mammals together in societies:

(1) The instinct of service, especially between members of the same family or social group.
(2) The fear of isolation, or disapproval, and the desire for fellowship, or sympathy.
(3) The tendency to follow trusted leaders, but not to depart too far from precedents.*

These are the integrating, co-ordinating, harmonizing bonds which unite men in societies. They are deep-seated instincts not easily overcome. The presence and power of these instincts in practically all peoples of the earth has been demonstrated in a most remarkable manner during the Great War. It is reassuring to find that the integrative instincts on which society is founded have not disappeared, and while these foundations remain let no one despair of the future of society.

* See Trotter, "Instincts of the Herd in Peace and War," London, 1916.

On the other hand, among the higher mammals and especially among men there are disintegrative instincts or desires which tend to disrupt societies or at least to create disharmony. Among these are:

(1) The desire for individual freedom, even when it conflicts with the welfare of society.
(2) The tendency to limit social co-operation to groups or classes based upon family, racial, national, temperamental, environmental, industrial, intellectual, or religious homogeneity.

Such disruptive instincts are not unknown in animal societies. Ant-colonies often wage relentless war upon other colonies, even though they be of the same species. Under certain circumstances bees become ruthless robbers and marauders, waging a war of extermination upon weaker or defenseless colonies, and even upon other species of animals; indeed the robber instinct of bees seems to be a kind of frenzy, or madness, which is possibly the result of fear and the defensive instinct. In all animals the class instinct serves to bind together more firmly the members of the same class or colony, while at the same time it widens the gaps between different classes and colonies. Indeed, it may be said that in animal societies there are practically no bonds between different groups

or colonies. These class instincts are very evident among men. Fortunately they are opposed by the harmonizing and unifying instincts, and most of all by intelligence and reason.

The incompleteness of integration, co-operation, and harmony in human society is due to the fact that imperfect intelligence and freedom have come in to interfere with instinct. Disharmony in ourselves and in society is the price we pay for personal intelligence and freedom. The more intelligence one has the greater is his freedom from purely instinctive responses, but man is never wholly free from the influences of instinct. The personal freedom which endangers human co-operation opens at the same time a new path of progress along rational lines. In our individual behavior and in our social activities we now seek the ideal harmony of the hive, but on the higher plane of intelligence, freedom, and ethics.

The past evolution of man has occurred almost entirely without conscious human guidance; but with the appearance of intellect and the capacity of profiting by experience a new and great opportunity and responsibility has been given man of directing rationally and ethically his future evolution. More than anything else, that which distinguishes human society from that of other animals is just this ability—incomplete though it is—to control instincts and emotions by intelligence

and reason. Those who maintain that racial, national, and class antagonisms are inevitable because they are instinctive, and that wars can never cease because man is by nature a fighting animal, really deny that mankind can ever learn by experience; they look backward to the instinctive origins of society and not forward to its rational organization. We shall never cease to have instincts, but, unless they are balanced and controlled by reason, human society will revert to the level of the pack or herd or hive. The foundations of human society are laid in gregarious instincts, but upon these foundations human intelligence has erected that enormous structure which we call civilization.

II

PROGRESS IN HUMAN HISTORY

THE history of mankind seems to the casual observer an eternal struggle for existence or supremacy on the part of individuals, tribes, classes, nations, and races. One ideal or people for a while gains ascendancy and then goes down before other ideals or peoples, and at times it seems that the human race learns nothing from experience. Some one has said that "the only thing we learn from history is that we learn nothing from it." Many persons maintain that "what has been will be"; wars, oppression, domination of one group by another will never cease either because they were ordained by the Creator or are caused by ineradicable traits of human nature.

Human history viewed as such a record of unconnected events is comparable to natural history before the general acceptance of the doctrine of evolution, when every species of animal or plant was regarded as a distinct and special creation.

The evolutionary view of history has now largely replaced this older view, and just as in the case of the evolution of organisms, so, also, in human history we recognize series of changes genetically

connected but leading nowhere except to mere diversity, others which lead to increasing adaptation to peculiar conditions, and still others leading to increasing perfection and complexity of social organization—that is, *divergent, adaptive, and progressive types of evolution characterize human history as well as the history of animals and plants.* As in the evolution of organisms, so, also, in human history there have been innumerable changes or diversities that have led nowhere; there have been many changes which have led merely to better adaptation to peculiar conditions; there have been very few lines of progress.

Kant held that human progress consists in moral self-development and self-liberation from the dominion of nature leading to a state of the greatest possible liberty. He recognized the development of *reason* in the human species and the establishment of universal *justice* through international action as the goal of history. Hegel, Fichte, and Michelet represented *freedom* as the aim of history; Schelling, the harmonizing of freedom and necessity, of self-will and the universal will. Condorcet believed that the growth of *equality* between nations and classes—not absolute equality, but equality of right and liberty—was the chief lesson of history. Herder, Flint, and many others regard the growth of the idea of human *unity*, of universal brotherhood, as the chief line of progress throughout the

historic era. Wells has recently undertaken to trace the increasing size of governmental units, the evolution of the *world state*, and the growth of the ideal of unification as one of the great lines of human progress. Others see in the progressive *conquest of nature* one of the chief lines of progress throughout history. To others the growing opportunities, rights, and powers of the common man, in short, the growing spirit of *democracy* marks the greatest advance of human society.

These lines of human progress are not conflicting, nor even independent of one another. The development of reason in the human race—that is, of rational co-operation—must involve the development of universal justice. The growing freedom of the individual in body and mind must be reconciled with increasing social obligations. The development of the idea of human unity and brotherhood must ultimately carry with it the idea of equality of right and liberty, and of world unification. The conquest of nature means greater freedom through harnessing natural forces rather than human bodies, through controlling environment rather than being controlled by it. And all of these lines of social progress are correlated with the growth of democracy.

By placing exclusive or even undue emphasis upon ideals of individual freedom or of social obligations, of nationalism or of world unification,

of class or race superiority or of democratic equality, different peoples and ages have built up great but unstable civilizations. Genuine and enduring progress can be achieved only by the reconciliation of these ideals, which are antagonistic only when held in extreme forms.

Again and again in the evolution of animals and plants extreme specialization in certain lines has brought about rapid progress, but has led to a lack of stability and adaptability and has ended in extinction. And there is good reason to believe that the same is true of the evolution of human society. Extreme development of ideals of organization and efficiency, or of liberty and equality, leads to an unbalanced state of society; stable progress consists in advances along many correlated lines.

Specialization and co-operation under powerful autocracies were apparently more perfect in many ancient states than in any modern ones. Probably no modern state has equalled the perfection of such forced organization and efficiency as was present in Egypt under the Pyramid builders. Those present-day reformers who desire to force upon the masses of mankind the rule of intelligent and powerful autocracies in the interests of efficiency would do well to reflect upon the lessons of history.

Life and evolution, man's body, mind, and society are founded on compromise. Fanatical

individualism or socialism, universal equality or inequality, absolute autocracy or democracy find no foundation or counterpart in biology, for life and all of its activities consist in compromise, balance, adjustment between opposing principles.

III

THE BIOLOGICAL BASES OF DEMOCRACY

THESE are some of the biological and historical backgrounds of human society. Let us now apply some of these principles of evolution and progress to that system of social organization which we call democracy.

There have been, and still are, many kinds of democracy in many fields, and it is therefore difficult to draw a very sharp and discriminating definition of what is meant by this term. But it will be admitted, I think, that democracy in the widest sense means much more than a form of government, that it is indeed a system of social organization affecting almost every relation of man to man. *It is a system which, ideally at least, attempts to equalize the opportunities and responsibilities of individuals in society.* As thus defined it would apply not merely to government and the administration of justice but also to education and individual development, to industry and its reward, property.

But this ideal of absolute equality has never been,

and can never be, fully realized in human society because nature has made men unequal in every respect—physically, intellectually, and morally—and there is no possible way in which such natural inequalities can be wholly eradicated. Furthermore, the very nature of organization, that is, specialization and co-operation, implies inequalities and limitations; without these there could be no such thing as society or progress. A society in which every individual is absolutely free and equal would be not only an impossibility but also a contradiction in terms.

Looked at merely as a system of government, a democracy in which all the people rule directly, as in ancient Greece, is an impossibility in any populous state. Instead, modern democracies are representative governments, in which the people as a whole choose their representatives to administer the government for them. General policy may be determined by the people, but the details of carrying out of any policy must be left to chosen leaders. Further, it has been found necessary to hedge about even such a modified democracy as this by limiting suffrage to adult persons, not feeble-minded, insane, or criminal; and it is perfectly evident that higher intellectual qualifications are necessary.

The mental tests used in our army revealed a surprising amount of illiteracy, and, what is much

worse, an alarmingly low level of average intelligence. These tests were devised to measure intellectual capacity or inherited ability rather than acquired information or education, and for the first time they give us a means of estimating the approximate number of persons in this country of low, mean, or high intelligence. The tests were of two sorts, the Alpha test for those who could read and write, the Beta test for all others. These tests were taken by about one million and seven hundred thousand drafted men, who may be assumed to have been somewhat above the average intelligence of the entire population since none who were evidently feeble-minded were drafted. Seven grades were recognized, ranging from A to D−, these grades being designated as follows: A "very superior intelligence," B "superior," C+ "high average," C "average," C− "low average," D "inferior," D− "very inferior." The "mental ages" of these different grades and the relative numbers in each are shown in the following table:

GRADE	MENTAL AGE	PER CENT OF WHOLE
A	18–19	4½
B	16–17	9
C+	15	16½
C	13–14	25
C−	12	20
D	11	15
D−	10	10

Assuming that these drafted men are a fair sample of the entire population of approximately 100 millions, this means that 45 millions, or nearly one-half of the whole population, will never develop mental capacity beyond the stage represented by a normal twelve-year-old child, and that only 13½ millions will ever show superior intelligence.

When it is remembered that mental capacity is inherited, that parents of low intelligence generally produce children of low intelligence and that on the average they have more children than persons of high intelligence, and, furthermore, when we consider that the intellectual capacity or "mental age" can be changed very little by education we are in a position to appreciate the very serious condition which confronts us as a nation.

We have always recognized that the success of democracy depends upon the intelligence of the people, but we have never before had any adequate conception of the very low level of the average intelligence of the nation. Furthermore, we have generally assumed that intelligence depended upon education and that general compulsory education would solve all our problems. Education is still one of our greatest needs, but, alas, it is not the magical panacea that was once supposed. Education can only bring to development the qualities which are potentially present; it cannot increase those potentialities or capacities; and the attempt

to educate a person of D grade beyond the fifth year of the elementary schools is usually wasted effort.

Undoubtedly the ultimate standing and success of any popular government must depend upon the intelligence of its citizens, and yet owing to the larger families of the unintelligent and to the great influx of foreigners of low mental capacity, our average intelligence has probably been declining for the past twenty-five years at least.

There is some demand, especially on the part of police authorities, that finger-prints be made of every person in the nation for purposes of identification; how much more desirable it is that every person be classified mentally! By this means we could avoid untold waste of time and effort in trying to give higher education to those incapable of profiting by it and in trying to fit the wrong persons into particular positions. And at the same time we should greatly increase the happiness and contentment of the people concerned, for nothing is so productive of unrest and discontent as the putting of men and women into positions which they are incapable of filling, or, worse still, of assigning persons of high capacity to low-grade work. Let us have the finger-prints, but before everything else let us have a mental classification of all children of school age. When once this has been done perhaps the least intelligent group can ultimately

be denied the suffrage as are imbeciles, insane, and criminals at present.

All these things are limitations, adjustments, balances necessary to make democracy a practical system of government. Many of them were plainly expressed and others were implied in the foundations of our government. They are not arbitrary but necessary limitations of the ideal of universal liberty and equality. But there are other limitations in modern society which are not absolutely necessary and some of which are very undesirable, and there has recently arisen an insistent demand on the part of great numbers of people for a purer form of democracy, one in which there will be a larger degree of liberty and equality than any the world has ever seen. Does progress lie in the direction of greater personal liberty and equality? Is pure democracy a primitive or an advanced stage in social evolution? Is it the goal toward which the race is moving or merely a stage through which it is passing?

There can be no doubt as to the direction in which all mankind is moving at present. At the close of the greatest war in history, a war which we fondly hoped was fought "to make the world safe for democracy," a tidal wave of democracy has covered the whole earth. The most ancient and powerful autocracies of Europe have gone down in the wreckage of the war and so-called democra-

cies have taken their place. The plaintive appeal of Carl of Austria to Ferdinand of Roumania, "We kings must stand together now," was a recognition, when too late, of the conquering forces of democracy which were released by the war. Democracy is taking possession of the world not merely in forms of government but also in the management of industry, the distribution of property, the purpose and character of education. It begins to appear that the world is not only safe for democracy, but that it is unsafe for anything else.

Our passion for democracy has been with us a kind of religion; it has rested in the main upon instinct rather than reason, upon sentiment rather than science. No one of us would wish to disturb the firm foundations of our faith, which are laid in instincts and emotions, and yet it is our privilege and duty to give reasons for the faith that is in us and to examine the merits and demerits of our institutions in the light of knowledge and experience. If democracy is to endure and prevail it must rest upon science as well as sentiment. Popular approval or disapproval will not alter the course of nature and civil laws cannot abolish natural ones.

In spite of the growth of democracy not a few thoughtful people are afraid of it and many would gladly see it limited still further in extent or application. Before the war there was apparent in

this country a growing distrust of democracy, especially on the part of those who are somewhat removed from the ranks of the common people; during the war this distrust was more or less concealed, but now amid the social earthquakes which are shaking the world this feeling is greatly increased, and we are now witnessing such a conflict of opinion regarding universal democracy as the world has never before known.

Distrust of democracy runs through the histories of all nations, ancient and modern. It was shown even by the founders of this greatest of democracies in the limitations which were placed upon citizenship and suffrage and in the many attempts which were made to guard the highest offices against popular interference, as, for example, in the constitutional provision for the election of the President by an electoral college, the election of senators by State legislatures, and the appointment of judges by the executive. It appears to-day in the conflicts between labor and capital, the opposition to woman's suffrage, the fear of popular control of education, and the alarm over the spread of socialism and internationalism throughout the world.

Furthermore, this distrust is increased by the failures and short-comings of democracy in many countries where it is being tried, at least nominally. Alleyne Ireland,* in particular, has recently criti-

* *Journal of Heredity*, Dec., 1918, and Nov., 1919.

cised the whole system of democracy not merely because of its faults and failures but also because of its fundamental principles, claiming that it substitutes the rule of "ignorant masses" for that of intelligent leaders, and the "blind god of numbers" for wisdom and experience. We hear much of the tyranny, inefficiency, ignorance, and corruption of democracies and unfortunately much of this is only too true. Democracy is charged with being responsible for all these sins, whereas in many instances they are due to some of the worst types of autocracy which are merely shielding themselves under the name of democracy. We do not change the nature of anything by merely changing its name and an autocracy, oligarchy, or aristocracy that calls itself a democracy cannot be used to disprove the value of real democracy.

Again many of the faults which are charged up against democracy such as emotionalism, irrationalism, blind partisanship, and selfishness are found under every other form of social organization and cannot properly be attributed to democracy but belong rather to human nature; the most that can be said of these is that democracy no more than other systems has been able to eliminate them.

No system of government lives up to its best ideals and no single system is universally adapted to all people. No doubt democracy operates best

with those in whom superior intelligence is associated with high morality, in whom the love of freedom is associated with a compelling desire for social order and justice. No doubt it is generally better for parents to govern young children than to make them absolutely self-governing; no doubt people of superior intelligence and morality can govern primitive people more efficiently than they can govern themselves; no doubt a wise and beneficent autocracy can accomplish many desirable things which an ignorant and corrupt democracy cannot. The question which lies back of all this is, What is the ultimate purpose of government? In the case of children, is it not to bring them to a condition where they can wisely govern themselves? Is the ultimate purpose different in the case of primitive peoples, or of the masses in a democracy? Is not the ultimate aim of government the highest possible development of the individual, the nation, and the race? Is not the educative power of democracy its greatest virtue?

These great problems of the hour should be viewed not only in the light of human history, but also in the long perspective of the history of living things upon the earth. Undoubtedly the fundamental concepts of biology apply to man no less than to other organisms, but it must be admitted that the application of biological principles to specific problems of social organization is often of

doubtful value. Thus we find that biological sanction has been claimed for wholly antagonistic opinions, as, for example, for and against war, communism, woman's suffrage, polygamy, etc. Those who are searching for biological analogies to support almost any preconceived theory in philosophy, sociology, education, or government can usually find them, for the living world is large and extraordinarily varied, and almost every possible human condition has its parallel somewhere among lower organisms, where we find many kinds of degeneration as well as progress.

This uncertainty and ambiguity in the application of biological principles to man and his institutions, has brought this whole process of reasoning into disrepute among those who look upon man as a being who stands wholly outside the realm of biology, but in spite of the uncertainties of biological analogies when applied to minor phases and problems of human society, no one who has felt the force and sweep of the great doctrine of evolution, can doubt that biological principles underlie the physical, intellectual, and social evolution of man—that biology is a torch-bearer not merely into the dark backgrounds of human history, but also into the still more obscure regions of the future development of the race.

The Declaration of Independence is, in many respects, the charter of our democracy. Adopted at a time when it was necessary to secure the ut-

most co-operation of the Colonies and of the world, it made its appeal directly to the social instincts, as well as to the intelligence of men, to their love of freedom, justice, and equality. The rights of man have ever been the foundation-stones of democracy. The Declaration held "these truths to be self-evident; that all men are created equal; that they are endowed by their Creator with certain inalienable rights; that among these rights are life, liberty, and the pursuit of happiness. That to accomplish these purposes, governments are instituted among men, deriving all their just powers from the consent of the governed." Here are the foundation principles of democracy, which are summarized more concisely in the motto of France—"Liberty, Equality, Fraternity."

What is the teaching of biology regarding these principles of democracy? How can we harmonize individual liberty and social organization, democratic equality and hereditary inequality, universal fraternity, and national and class hostility? Or to put the question in a more practical form—How can we develop social organization in spite of individual liberty, democratic equality in spite of hereditary inequality, universal fraternity in spite of national and class antagonisms? These are great problems, and the student of animal organization and evolution can do no more than to offer a few biological suggestions as to their solution.

IV

PERSONAL LIBERTY VS. SOCIAL ORGANIZATION

With the growth of intelligence among animals and men, responses to external stimuli and to internal instincts become less immediate and direct; memories of past experiences come in to modify or inhibit instinctive responses, and these responses are no longer as fixed and mechanical as when instinct acts alone. There thus arises a certain amount of freedom in behavior; such freedom is never complete, and is always directly proportional to the degree of intelligence involved, and inversely proportional to the strength of the instincts. The more intelligence one has, the greater is his freedom from purely instinctive acts, but man is never wholly free from the influence of instincts; the greater his rational and volitional powers, the more complete is his self-determination, but man is never entirely emancipated from external compulsions of his physical and social environment.

The birth and growth of freedom in man has led to many conflicts between instinct and reason, between personal desires and the social welfare.

Such conflicts are lacking among individual cells and other constituent parts of the body—as such fables as that of "the belly and the members" plainly imply. The perfect integration of the parts of an organism is the result of organic contact, especially through the nervous system, of chemical messengers or hormones which pass from one part to another, and of simple reflexes or tropisms. In societies such as those of ants and bees, the integrating factors are complex reflexes, or chains of reflexes, which are known as instincts. There is here so little intelligence and freedom that instinct is the only ruler and harmony is complete. As Huxley says: "Each bee has its duties and none has its rights." The incompleteness of integration, co-operation, and harmony in human society is due to the fact that imperfect intelligence and freedom have come in to interfere with instinct. Disharmony in ourselves, and in society, is the price we pay for personal intelligence and freedom.

The history of mankind has been one long struggle for freedom—freedom not only from the control of irrational instincts, but also and chiefly from the compulsion of outside forces and of other persons. The eternal struggle against unfavorable environment, and for the conquest of nature, the battles for personal freedom in thought, speech, and act, and for social freedom in religion, government, and industry, are among the noblest aspirations of

man. The struggle to be free is part of a great evolutionary movement, and yet in any society individual freedom must be limited in the interest of the common good, and the larger and more complex the society, the greater must be these limitations. Here, as elsewhere, life and evolution are balanced between opposing principles. Should the human ideal be individual freedom or social co-operation, liberty or duty, individualism or socialism? It may be granted at once, that both of these alternatives are desirable, and to a certain extent attainable, but where one must be sacrificed for the other, which should it be? Is the ideal state one in which the social bond is as loose as possible and individual freedom is the chief aim, or is it one in which the bond is as close as possible, and the good of the nation or race or species is the supreme object?

There can be no question as to the biological answer. The whole course of evolution from amœba to man is marked by increasing differentiation and integration of the constituent parts of the organism; the whole course of development from the egg to the adult is a series of progressive differentiations and integrations of the constituent cells; the most essential feature of biological progress consists in the subordination of minor units to the larger units of organization. In the relations of organisms to one another, nature

invariably sacrifices the individual, if it be necessary, for the good of the colony or race or species. Race preservation and evolution is the supreme good and all considerations of the individual are subordinate to this end.

Is it possible that the same rule of progress which applies all along the way from amœba to man is set aside when we come to human society? Does democracy, as contrasted with autocracy or aristocracy, mean greater freedom for the individual and a looser social organization? If it does it would seem, from a biological point of view, to be doomed to retrogression or extinction, for it would represent a return toward the protozoan condition, a process of disorganization and devolution rather than of progressive organization and evolution.

Undoubtedly the usual conception of democratic freedom does involve just this idea of maximal individual freedom and minimal social control, but individualism is not a necessary part of democracy, and, when carried to extremes, it ends in anarchy. In this country we still cling to the ideals of a pioneer society in which there is little specialization and co-operation, and great personal freedom; indeed, to many persons such a condition seems the best possible one and the only one consistent with democracy. Such ideals represent a primitive and not an advanced stage in social

evolution. As a people we exalt freedom above service. Liberty is our national deity; her image is stamped on our money, her colossal figure is the first to greet the stranger from other lands. America is above all else the "sweet land of liberty."

And yet a change in our conception of liberty has been coming over the nation; we are finding that the pioneer ideals of personal liberty and independence are incompatible with the requirements of a populous country and a well organized society. We still preserve the ancient formulas, but their content is changing and must continue to change as society develops. Personal freedom must be subordinated more and more to social freedom, and pioneer society must give place to the more highly organized state in which increasing specialization and co-operation are the companion principles of progress.

Lack of specialization is said to be one of the fatal faults of democracy. Mr. Ireland says* that in all other affairs of life we demand specialists, but "in government we are asked to submit expert control to the inexpert." So far as our particular democracy is concerned, it must be admitted that too often this charge is true. Our lack of specialization is reflected in our contempt for specialists and experts of every sort. The belief

* *Loc. cit.*

is wide-spread that one man's opinion is as good as another's, and that expert knowledge is merely another way of fooling the people.

Every year our State legislatures are flooded with bills against vaccination and animal experimentation, introduced by provincial Solons who firmly believe that they know more about these subjects than men who have devoted their lives to them. We intrust education to those who can find no other occupation and who can scarcely manage to keep one lesson ahead of their classes, apparently with the idea that any one can teach. We leave the control of food, fuel, clothing, and other necessaries of life to speculators and dirty middlemen, and the health, happiness, and employment of the people to Providence or to selfish exploiters. In a democracy where "every citizen is a king" we assume that statesmanship comes by nature; almost every citizen thinks that he could solve complex problems of government, ranging all the way from parochial affairs to international relations, better than those who have devoted years of study to them. We elect demagogues and grafters to political office so frequently that the very name "politician" has come to be a reproach. We send narrow partisans to Congress, and, by stupid adherence to party regularity, men wholly untrained in statesmanship are frequently put into the most important public places. It

is generally assumed that appointive positions will go to men who have been successful in winning votes, and positions requiring great technical knowledge are often filled by political figureheads with the suggestion that subordinates can do the work.

This lack of specialization is seen also in our systems of education. Nature gives us many types of individuals, there is abundant opportunity for specialization, but we do our best by education to eradicate these differences and to make all citizens alike. Regardless of inherited capacities or intended occupations, we attempt to fit all persons to the same Procrustean bed. The argument has been advanced against woman's suffrage that women are different from men, as if all citizens in the state, all cells in the body, should be exactly alike. There is arising a new demand for education for service, for training for efficiency, and this demand is sure to increase. Many kinds of citizens are needed to make up a nation, and many kinds of education are needed for many kinds of service. How preposterous it is that boys and girls, laborers and scholars, farmers and merchants should receive identical training for their varied services to society. And yet the aim in this has been a good one; namely, to bring about social unity and harmony. Again we stand between opposing forces, again we sail the narrow sea be-

tween the Scylla of no specialization and the Charybdis of no co-operation.

These are serious defects in our social system, and they must be reformed if we are to make progress, or even to hold our present position; but it should not be forgotten that as a nation we have only recently emerged from a pioneer condition in which there was little specialization and co-operation, and as a people we are rapidly becoming more highly specialized without becoming less democratic.

Lack of specialization is no essential part of democracy. Specialists in all fields of human activity are developed in democracies no less than in other forms of government, and if in selecting men for public office we still retain some of our pioneer ideals, this phase of our development is rapidly passing. No doubt we often make mistakes in choosing men for public positions, but do other forms of government avoid such mistakes? In a democracy these mistakes may be quickly remedied; when we become sufficiently aroused, "we turn the rascals out," but it is more difficult to get rid of a corrupt or incompetent autocrat.

Does democracy mean that every citizen knows how to govern the country, or wage war, or conclude peace, or develop industry, or conserve the public health, or do a thousand other things which are necessary in a modern state? Certainly not; *ideal democracy means not less specialization, but*

fuller co-operation than in other forms of government. In science, medicine, education, commerce, industry, agriculture, and innumerable other fields, we must have specialists, and the same is true of the various functions of government. The war has done us a great service in awakening us to this fact and it will be a crime against civilization and progress if we allow the nation to settle back once more into the conditions which prevailed before the war.

However, candid persons must recognize that there is abundant justification for the popular mistrust of certain types of experts. Sad experience has demonstrated again and again that a man may know a great deal about some specialty and still show a lamentable lack of good judgment. Narrowness of outlook and intense specialization often make "learned fools." Specialization of this type is like overspecialization in physical evolution, it leads to lack of balance and adjustment, and ultimately to elimination.

Few nations have ever equalled the degree of specialization shown by the late Imperial German Government. All citizens, from the Emperor down to the common soldier, had undergone long training for their special duties. And yet it is the general opinion of most people, including the Germans themselves, that few nations ever made more serious blunders in policy, diplomacy, and even in

military operations. These blunders were not in the technical execution of particular tasks, in which they were marvellously efficient, but rather in lack of broad judgment and common sense; inability to forecast the effects of "Schrecklichkeit," of unrestricted submarine warfare, of arrogant and violent propaganda. All this is evidence of overspecialization with a corresponding lack of balance.

We see many evidences of such overspecialization in our own country—theologians who think they know the whole counsel of God but who have a very insufficient knowledge of human conditions and needs; educators who have elaborated marvellous theories but can never make them work; psychiatrists who can classify the entire population under certain types of neuroses or psychoses but who are themselves striking examples of lack of balance; specialists in science or medicine or law, whose overspecialization leads them into the greatest absurdities. And what are we to conclude when specialists differ so fundamentally as do our greatest authorities in constitutional government and international law on the merits or demerits of the League of Nations? The common people may not know much about this subject, but they cannot differ more widely than do the experts.

However, out of all such conflicts of opinion

there is apt to come in time balance and poise, just as out of the struggle for physical existence there comes adjustment and adaptation. It is not without reason that we call those judgments which have been reached by multitudes of men as the result of "trial and error," and finally trial and success, "common sense," and recognize it as the highest type of practical judgment.

Our lack of co-operation has been even more evident than that of specialization. Insistence on personal freedom and on the rights of individuals has gone far toward weakening the bonds of union and destroying co-operation. The disharmonies of society, and the conflicts of interests and minds and purposes, have come largely from the exalting of individual rights over social obligations. We need a new Revolution which will enforce the *duties* of man, as our former Revolution emphasized the *rights* of man. How easily the disharmonies of society could be silenced, and the conflicts between individuals and classes and nations could be settled, if men were taught to think more of their duties and less of their rights. Unquestionably the further evolution of society must lie in the direction of greater co-operation, and any system of organization which exalts individual freedom to the detriment of social union and harmony must go under in the struggle for existence.

These very serious defects in our social organiza-

tion are not so much the results of democracy as of the character, education, and condition of the people; the perfection or imperfection of the social system is a reflection of the popular intelligence and morality. Ignorant and selfish ideals of democracy, or of any other social system, may lead astray whole nations and generations, but democracy itself is not responsible for the ignorance, selfishness, and hate which exist in the world; rather, these evils have been greatly intensified by the lack of genuine democracy.

The greatest problem which confronts all types of government is the problem of social co-operation. It was the failure of co-operation rather than of specialization which led to the downfall of almost every great civilization of the past, and it is this danger especially which confronts the modern world. With the increasing size of social units, specialization does, to a considerable extent, take care of itself, but co-operation under these conditions tends to grow weaker. Efficient co-operation may, for a time, be forced upon a people by a powerful autocracy, but history has generally shown that such a course ends in class antagonisms and the destruction of social union. Self-government and majority rule are generally recognized as the best form of government for intelligent people; a paternal form of government may be better suited to ignorant and undeveloped races, but only

with the understanding that the ultimate purpose of government is the development of the governed, and that the end and aim of social evolution is co-operation without compulsion. A genuine democracy seeks and obtains a degree of co-operation which compulsion can never obtain.

False ideals of democratic liberty and equality have done, and are still doing, vast harm in the world. It is the duty of all who love democracy to resist these false ideals and to promote those which are consistent with social progress. Real democratic freedom is not the freedom of isolation, nor of anarchy; the liberty for which the peoples of the world are fighting and dying is not the liberty of a Robinson Crusoe who is "monarch of all he surveys," nor yet the lawlessness of anarchy and revolution; it is not freedom to plunder or oppress or dominate others, but the freedom of fellowship, common service, and mutual esteem; not freedom from general social control, but freedom from the tyranny of selfish individuals and classes. Normal human beings do not desire a kind of freedom like that of cancer cells, for example, which run riot without regard to the welfare of the organism, but rather a freedom like that of the normal cells of the body, each of which is a unit, preserving its own individuality, and to a certain extent its own independence, and free to do the work for which it is fitted under the control of the body as a whole.

Men do not desire a freedom like that of the solitary wasp, which lives and works alone, but rather a freedom like that of ants or bees in a colony where each individual is free to serve as best it can under the control of the colony as a whole, or of what Maeterlinck calls, "the spirit of the hive." It is a mistake to ascribe monarchical or class ideals drawn from human society to the ant or bee colony. The so-called "kings," "queens," "soldiers," and "workers" are in no sense rulers or subjects or favored classes. Each does "what seems good in his sight," namely the work which it is fitted by nature to do, and there is no ruler but instinct; each shares in common prosperity and hardships, and is esteemed according to its capacity to serve the common good. Democracy can offer, and normal human beings can desire, no other freedom for the individual than this—based however on reason and ethics rather than upon tropisms and instincts.

But there is a vastly larger and more important freedom which democracy brings to society as a whole. The freedom of the individual man is to that of society as the freedom of a single cell is to that of the human being. It is this larger freedom of society, rather than the freedom of the individual, which democracy offers to the world; free societies, free states, free nations rather than absolutely free individuals. In all organisms, and in all social

organizations, the freedom of the minor units must be limited in order that the larger unit may achieve a new and greater freedom; and in social evolution the freedom of individuals must be merged more and more into the larger freedom of society. The liberty which we worship is not, or at least should not be, that of the individual, but rather that of society as a whole—the freedom of nations and races rather than that of individuals, the self-determination of peoples rather than of persons. This is the biological ideal of freedom, and it should also be the democratic ideal.

V

DEMOCRATIC EQUALITY VS. HEREDITARY INEQUALITY

EQUALITY is one of the most important factors in producing social harmony. It is the dearest one of the democratic graces. 'And now abideth Liberty, Fraternity, Equality, but the greatest of these is Equality.' The creed of democracy has generally been that all men are created equal, and that the inequalities which exist are due to environment, education, or opportunity.

And yet nothing is more evident than the inequalities of personality, intelligence, usefulness, and influence; and the inequalities of heredity are greater even than those of environment. Recent work on development and evolution shows that the influence of environment is relatively slight, that of heredity overwhelming. Not only poets, but also scholars, statesmen, leaders, and laborers are born and not made. Hereditary inequality has always been the strong fortress of aristocracy, and scientific studies of heredity seem on first thought to support the contentions of aristocracy in this respect rather than those of democracy.

How shall we harmonize the teachings of biology with those of democracy; the proven inequalities

of heredity with the assumed equality of man? Shall we revise our ideas of heredity, or of democracy? I have sometimes been asked: "Do you believe in heredity; how then can you believe in democracy? Do you believe in equality; how then can you believe in heredity?"

Aristocracy is founded upon an obsolete idea of heredity, namely the "law of entail." It confuses social and biological inheritance. A son may inherit the property of his father but not his personality; under the law of primogeniture the oldest son inherits the kingdom, titles, privileges of his father in their entirety, but not his intelligence, character, and personality. In natural or biological inheritance the germinal causes of the traits of the parents are separated and are redistributed to their offspring so that the latter are "mosaics" of ancestral traits. These germinal causes of traits, which are called genes, are transmitted unchanged, but in the fertilization of the egg one-half of the genes from each parent is lost and is replaced by half from the other parent. So numerous are these genes that the combinations of them in the offspring are rarely, if ever, the same in two individuals, and so complex is their influence upon one another and upon the process of development, that no two sexually produced individuals are ever exactly alike. Consequently the best traits may appear in parents and be lost in their offspring;

genius in an ancestor, may be replaced by incompetence, imbecility, or insanity in a descendant. As each generation must start life anew from the germ cells, so in every person there is a new distribution of hereditary factors or genes. Every person has a new hereditary deal, if not always a square one.

Owing to the fact that some traits, or rather their genes, are dominant and others recessive, certain of the latter may be carried along for several generations in a latent condition only to appear in some later offspring in which the dominant gene is not present. Feeble-mindedness, for example, is a recessive character, and East has calculated that it is present in a recessive form in one person out of fourteen of the entire population of this country, but it does not actually appear unless two of these recessive genes come together in a fertilized egg. On the other hand, feeble-mindedness and other recessive characters become latent when mated with normal and dominant characters. The later history of the famous, or rather infamous, "Jukes family" shows that many of the descendants are normal and useful citizens probably because their parents married into normal families.

This is the great law of heredity discovered by Mendel, and it differs fundamentally from the law of entail. Property may be entailed, but not personality; titles and privileges, but not character and ability. With the law of entail in mind, it is

not surprising that strict hereditarians should have questioned the reputed parentage of Jesus, or Shakespeare, or Lincoln, or that lovers of democracy should have refused to believe in this kind of heredity; but the law of entail is of man's making, while, so far as we know, the law of Mendel is the only law of natural inheritance.

Think of the great men of unknown lineage, and the unknown men of great lineage; think of the close relationship of all persons of the same race; of the wide distribution of good and bad traits in the whole population; of incompetence and even feeble-mindedness in great families, and of genius and greatness in unknown families, and say whether natural inheritance supports the claims of aristocracy or of democracy.

When we remember that most of the great leaders of mankind came of humble parents; that many of the greatest geniuses had the most lowly origin; that Shakespeare was the son of a bankrupt butcher and an ignorant woman who could not write her name, that as a youth he is said to have been known more for poaching than for scholarship, and that his acquaintance with the London theatres began by his holding horses for their patrons; that Beethoven's mother was a consumptive, the daughter of a cook, and his father a confirmed drunkard; that Schubert's father was a peasant by birth and his mother a domestic servant; that Faraday, perhaps the greatest scientific discoverer of any age,

was born over a stable, his father a poor sick blacksmith, his mother an ignorant drudge, and his only education obtained in selling newspapers on the streets of London and later in working as apprentice to a bookbinder; that the great Pasteur was the son of a tanner; that Lincoln's parents were accounted "poor white trash" and his early surroundings and education most unpromising; and so on through the long list of names in which democracy glories—when we remember these we may well ask whether aristocracy can show a better record. The law of entail is aristocratic, but the law of Mendel is democratic.

Quaint old Thomas Fuller wrote many years ago in his "Scripture Observations,"

"I find, Lord, the genealogy of my Saviour strangely checkered with four remarkable changes in four immediate generations:—

1. Roboam begat Abia, that is a bad father a bad son.
2. Abia begat Asa, that is a bad father a good son.
3. Asa begat Josaphat, that is a good father a good son.
4. Josaphat begat Joram, that is a good father a bad son.

I can see, Lord, from hence that my father's piety cannot be entailed; that is bad news for me. But I see also that actual impiety is not always hereditary; that is good news for my son."

It may be objected that I have ended by denying that there is any inheritance, at least so far as intellectual and social qualities are concerned, but this is not the case. While it is true that good and bad hereditary traits are widely distributed among

all classes and conditions of men, they are not equally distributed. On the contrary the chances of good or bad traits appearing in offspring are much higher in some families than in others, but no family has a monopoly of good or bad traits, and no social system can afford to ignore the great personages that appear in obscure families, or to exalt nonentities to leadership because they belong to great families. In short, preferment and distinction should depend upon individual worth and not upon family name or position. This is orthodox democratic doctrine, but not the faith or practice of aristocracy.

Finally democratic equality does not now mean, and has never in the past meant, that all men are equal in personality. It is not a denial of personal inequalities, but is the only genuine recognition of them. On the other hand, rigid family and class distinctions are denials of individual distinctions. Democratic equality does not mean equality of heredity, environment, education, or possessions; least of all does it mean equality of intelligence, usefulness, or influence.

It does mean equality before the law, equal justice for all, no special privileges due merely to birth, freedom to find one's work and place in society. In short it means that every man shall be measured by his own merits, and not by the merits of some ancestor whose good traits may have passed to a collateral line.

Democracy alone permits a natural classification of men with respect to social value, as contrasted with all artificial and conventional classifications. It contributes more than any other system of government to the contentment, happiness, stability, and peace of a nation. It brings a message of justice, and hope, and inspiration to people in all walks of life. It inspires the youth of a land with visions and living examples of

> ". . . Some divinely gifted man
> Whose life in low estate began
> And on a simple village green;
>
> Who breaks his birth's invidious bar,
> And grasps the skirts of happy chance,
> And breasts the blows of circumstance
> And grapples with his evil star;
> . . . . . .
> And moving up from high to higher,
> Becomes on Fortune's crowning slope
> The pillar of a people's hope,
> The centre of a world's desire."

This was the passion which fired the souls of our fathers and led them to establish this great Republic, and this is the power and inspiration which recall us at this great crisis in the history of the world from our artificial aristocracies, and plutocracies, and class distinctions to a genuine democracy.

VI

UNIVERSAL FRATERNITY VS. NATIONAL AND CLASS ANTAGONISMS

EVOLUTION shows that we are all cousins if not brothers. The lines of descent from innumerable ancestors converge in us, and will radiate from us to innumerable descendants. Genealogists picture descent as a tree in which the trunk represents some single ancestor and the branches all of his descendants, but such a representation is wholly at variance with biological facts because in sexual reproduction every person has two parents. The "genealogical tree" is the result of an attempt to trace descent back to some one distinguished ancestor while ignoring all others. The various branches of a family do not trace back to a single trunk, but rather to an increasing number of branches. A graphic representation of descent is not a tree but a net in which every individual is represented by a knot formed by the union of two lines which may be traced backward and forward to an ever-increasing number of knots and lines until all are united in this vast genealogical net of humanity. If the number of our ancestors doubled in each ascending generation, as it would do if

the marriage of cousins of various degrees did not take place, each of us would be descended from more than a billion ancestors of a thousand years ago, let us say in the reign of William the Conqueror. Even allowing for numerous intermarriages of relatives it is highly probable that all people of English or French or German stock are descended from common ancestors of a thousand years ago.

A book * has been published recently in which several of our Presidents, heads of universities, and captains of industry and finance are shown to be descended from Charlemagne. This distinction is one which they share with probably more than half of the citizens of this Republic. Einhard, the contemporary biographer of Charlemagne, says that he had nine wives, besides many concubines, and although he was fond of his children he never knew how many he had. If it were possible to trace our genealogies far enough into the past and through all their ramifications it would be found that all of us are literally descendants of royalty, of Alfred and Charlemagne and William the Conqueror and of any and every other person of one thousand or more years ago who left many descendants—including nonentities and worse; we hunt up our noble ancestors and forget the others.

John G. Saxe, formerly known as the poet of democracy, once wrote:

* Browning, Charles R. "Americans of Royal Descent."

"Depend upon it, my snobbish friend,
Your family line you can't ascend
Without good reason to apprehend
You'll find it waxed at the farther end
By some plebeian vocation.
Or, worse than that, your boasted line
May end in a loop of stronger twine,
The plague of some worthy relation."

But while our lines of descent lead back to practically all people of the same race and country of a thousand or more years ago, we have inherited our traits of character from only a very small number of these ancestors. It is known that inheritance passes from one generation to the next in the germ cells, and more specifically in the chromosomes or deeply staining threads found in the nuclei of those cells.

The number of chromosomes is constant for every species, and typically each chromosome has come down in unbroken lineage from previous generations. But in the formation of the germ cells one-half of the specific number is thrown away and when egg and sperm unite the specific number is again restored.

In man there are probably forty-eight chromosomes, twenty-four from the father and twenty-four from the mother; but these are usually derived in unequal numbers from the four grandparents; for example, sixteen may come from the paternal grandfather and eight from the paternal

grandmother, four from the maternal grandfather and twenty from the maternal grandmother, or the number which comes from each grandparent may vary all the way from twenty-four to naught. One or more of the eight great-grandparents may have furnished no chromosomes and no inherited traits to the great-grandchild, and finally no one in the world can inherit chromosomes (or traits) from more than forty-eight contemporary ancestors, assuming that the chromosomes preserve their identity, since no one has more than forty-eight chromosomes. Consequently, although each of us has had thousands of ancestors, he has had only a small number of transmitters.* Many a person bears the name of some distinguished ancestor but does not have a single one of his chromosomes or hereditary traits, whereas others who do not bear his name, and are usually reckoned as collateral descendants, have received his chromosomes and are his true inheritors.

There has been much foolish talk and loose thinking regarding old families and length of descent. As Tennyson says:

> "The gardener Adam and his wife
> Smile at the claims of long descent."

In length of descent we are all equal, and in com-

* I am indebted to my colleagues, Dean West and Professor Abbott, for suggesting this word to indicate those ancestors from whom chromosomes and hereditary traits are derived.

munity of descent we are all cousins if not brothers. Our lines stretch out to all our race. Each individual or family is not a separate and independent entity, but merely a minor unit in the great organism of mankind. Biology and the Bible agree that "God hath made of one blood all nations of men." There are no really pure lines of human descent, and few isolated stocks, and these owe their origin to geographical isolation rather than to anything else. There has been, and still is, abundant interbreeding among all minor varieties and races of men, and as a result mankind is a hopelessly mongrel species. Indeed, in this respect man is like any other wide-ranging species. He has no such claim to ancestral purity as has any pure breed of domesticated animals and plants. Man is indeed a wild species and cannot be domesticated because there is no one to domesticate him.

As a result of this common descent the resemblances between all types of men are vastly more numerous and important than the differences. This fact is especially evident to the biologist, for even the types which differ most widely, such as the white, yellow, and black races, are evidently only varieties or subspecies of *Homo sapiens*, while no other existing creature can be placed in the same zoological genus or family with man. When I reflect upon the resemblances between all men and the differences which separate man from

all other animals, I think I can understand the words of a prayer which I used to hear when I was a boy: "We thank thee, Lord, that thou hast made us men."

Nevertheless, in spite of this universal brotherhood of man, racial, varietal, national, and class antagonisms have arisen everywhere and have often led to terrible hostilities. Racial and varietal differences represent a natural classification based upon physical characteristics. There are also undoubtedly intellectual and social differences between these major subdivisions of the species, which tend to cause a natural and desirable social segregation of races, but while our instincts lead to such segregation they do not lead to nor justify racial antagonisms. The fundamental instincts of all types of men are so essentially similar that all may, and often do, live together harmoniously; and the co-operation of all types of men in organized society is so much a matter of education and environment that it has been demonstrated again and again, and nowhere better than in this country, that persons of the most distinct races may have the same social ideals and may co-operate in mutual helpfulness in the realization of those ideals.

When we come to those minor subdivisions represented by the so-called races of Europe, the natural distinctions are usually so slight that they form no barrier to the most intimate associa-

tion and co-operation. Most Americans represent mixtures of English, French, German, Scandinavian, and other European stocks and we generally think that the result is good, not only physically but also intellectually and socially. The inherent antagonisms between these stocks that agitators and designing politicians tell us about are really not inherent at all, but are largely created, cultivated, and magnified by hostile words and deeds for national and selfish purposes.

Race antagonism is almost always the outgrowth of ignorance and bigotry, and it is never judicial or scientific. It is easy to hate and despise people whom you do not know; perhaps this is a survival of an ancient instinct to repel foreigners. On the other hand, knowledge usually brings sympathy; "To know all is to pardon all." In any event a scientific study of different races reveals much that is admirable and praiseworthy in each, and all who love the truth will welcome the movement for race-appreciation begun by scientists and philanthropists in different parts of the world.*

As race antagonisms are generally the result of bad education, so they may be overcome by good training. Hope for the peace and progress of the world must rest largely upon the general cultivation of a spirit of tolerance and sympathy for other groups than our own, a realization of the fact

* Means, P. A. "Racial Factors in Democracy," Boston, 1919.

that good as well as bad qualities are found in all classes, nations, and races, and a spirit of justice that is willing to recognize and reward good qualities wherever they may be found.

The splendid ideals of personal service and sacrifice, and of national and international co-operation, which attended the World War have now largely passed away and a spirit of antagonism between classes, nations, races, and even religions has spread over the world. Bigotry has taken the place of sympathy, selfishness of service. This is partly due to a natural reaction from an unaccustomed idealism, but in part it is the result of the deliberate efforts of narrow-minded leaders to cultivate what they euphemistically call class and race consciousness, nationalism, and patriotism, but what in reality are class and race hatreds and national arrogance. The very men who are now preaching "America first" were recently damning those who sang "Deutschland über Alles." They are now counselling national selfishness, but at the same time are loud in their condemnation of labor unions and soviets that are showing a similar spirit of narrowness.

There is only one cure for this sickness of society, this failure of the democratic ideal of fraternity, and that is education—the cultivation of reason instead of passion, of co-operation in place of antagonism, of humanity rather than nationalism.

Unless these centrifugal tendencies can be overcome, they will surely lead to the destruction of our civilization.

But even the end of our civilization need not mean, and probably would not mean, the end of all social evolution. Other civilizations would probably arise on the ruins of ours as ours has succeeded many others. The teachings of biology and of human history indicate that further social progress must lie in the direction of the rational co-operation of all mankind. Whether our civilization survives or not, the probabilities are, that sometime these ideals of rational co-operation and of democratic fraternity will prevail.

Unfortunately for the present generation of men, social evolution has not yet advanced to the point where altruism is stronger than selfishness and where it is harder to stir up strife than to allay it. If those only who preach and practise selfishness were to fall victims to it and those only who take the sword were to perish by the sword, the elimination of the antisocial would be more rapid. But although many innocent ones perish with the guilty, nevertheless social evolution is moving toward the elimination of the antisocial. Progress is often slow and there are many back currents, but the long view of social evolution and of human history justifies the hope that there will come a time when altruism will be stronger than selfishness,

and democratic fraternity, than national and class hostility.

The biologist must look with concern upon the breaking up of European nations into minor independent units along lines of language, customs, or education, just as the intelligent American would deprecate the breaking up of his own country along similar lines. Biological and social progress does not generally lie in that direction, as the course of evolution clearly shows. In so far as the differences between peoples are due to environmental causes, they may be, to a great extent, removed. The most effective size of governmental units must vary with the possibilities of integration and co-operation of the constituent parts, and these possibilities are favored by homogeneity of race, language, and education, and by ease of intercommunication. All of these, except race, are environmental factors and are to a large extent subject to social control.

Even when differences are so great that segregation is desirable, it is usually possible to unite these smaller units into a larger federation, as the history of this nation has demonstrated. Indeed this is the only democratic way of counteracting the social and national disintegration which is so imminent in parts of Europe to-day. With the greatly increased facilities for communication and education which exist in the modern world enor-

mous national units of federated states are possible, including as in the case of the British Empire one-fourth or one-fifth of the entire human species under one general government, and it does not seem impossible that the greater part of the other three-fourths or four-fifths may yet be brought into some sort of federation. As the union of many cells into one body, the union of many persons into one colony, the union of many colonies into one nation have marked great advances in evolution so, let us hope, the union of many nations into the "Parliament of man, the Federation of the world" will mark the next great step in human progress.

Finally, when we come to those minor class distinctions which are based only upon occupation, wealth, or social position we have the most artificial and unnatural classification of all; and the antagonisms between these classes, which are engendered and fomented by designing agitators, are not only non-instinctive, but they are usually anti-instinctive and utterly irrational. This is not to say that men should not associate in congenial groups which have common interests and ideals; such associations are natural and inevitable; but when attempts are made to array one group or class against another and to make these classes permanent and hereditary, an artificial disharmony is introduced into society which can work only disastrously.

Hereditary social classes such as exist in many parts of Europe are the antithesis of democracy. That which is hereditary in such classes is not necessarily personal merit, but purely environmental advantages or disadvantages. Such artificial distinctions largely ignore the natural abilities or disabilities of men and are fundamentally unjust and undemocratic. On the other hand, classes such as are found in schools, which are based upon personal merit, and in which every one is free to pass from one class to another depending upon his ability, are not only wholly democratic, but are absolutely necessary to a well-organized society.

Means says: "The perfect democracy will be a state in which there will be classes absolutely rigid as to their functions for society but absolutely fluid as to the individuals who compose them. A man's or a woman's position in society will, in such a state, be determined by his or her peculiar aptitude and talents, not by hereditary position, nor by nepotism, nor by human authority, but solely by individual merit."*

What could be more wasteful, absurd, and tragic than a system of artificial class distinctions which condemns low-born genius to the humblest work and puts well-born blockheads in exalted places? All persons enjoy most the work which they are

*Loc. cit., p. 158.

led to believe that they can do best, and that nation will be most contented and most efficient whose people are free to find the places in the social system for which they are best fitted. This is one of the strongest arguments against hereditary classes, and in favor of a genuine democracy—not that in such a democracy all men are equal, but that all are free from purely artificial restraints in finding their own levels. One of the most beneficial influences of the Great War, and of wars in general, is the breaking up of rigid class distinctions, the elimination of stupid lords and junkers and military officers, and the elevation of men of genius to exalted places, irrespective of birth or social position.

Bateson, the English naturalist, has tentatively expressed the opinion that hereditary classes are desirable from the standpoint of eugenics, basing this opinion no doubt upon the fact that intellectual and social qualities are often, though, as he sadly admits, not always, characteristic of certain families. No doubt the best biological and social results would obtain if intermarriage occurred only between individuals of similar hereditary types. Such a segregation takes place naturally and normally where instinct and inclination are not interfered with by purely artificial restrictions and conventions. But even the oldest royal families, and much more our modern aristocracies and

pseudo-aristocracies, are of such mixed lineage that their children vary greatly in ability, and it is contrary to instinct and to good breeding for a woman of talent to marry the stupid son of a distinguished family, or for a man of genius to marry a shallow-minded heiress. It would be good for society in general, and for its individual members in particular, if every person were free to find his or her proper level both in occupation and marriage, irrespective of family obscurity or pride. In democratic America we all rejoice when some divinely gifted rail-splitter becomes by his own merits the greatest figure of his generation, and we ought to rejoice, though of course regretfully, when the ungifted son of a railroad president finds his proper place working on the track, or when the low-minded heiress elopes with the coachman.

When we turn from the more personal aspects of fixed social classes to their control of governments and of public affairs in general, we find that the evidence of their disruptive and antisocial influences are worst of all. The world has had experience of many kinds of exclusive class rule—absolute monarchy, aristocracy, middle class, and proletariat—and though some of these have proved better than others, they have all been bad, for they have endangered or destroyed social unity and harmony, and have ended sooner or later in disaster. Russia has recently gone from one of these

extremes to the other, and the end of the tyranny of the proletariat cannot long be delayed. An autocracy or aristocracy may be progressive and efficient, but it is always dangerous, for no person or class is wise or good enough to rule other classes or persons without their participation or consent. Not only do governments derive all their just powers from the consent of the governed, but they derive their safety and stability from this source as well. What a demonstration have the greatest military autocracies of Europe furnished the world of their utter weakness and helplessness against an aroused people!

The strength and stability of democracies are proportional to their inclusiveness, their breadth of base, whereas autocracies are inverted pyramids. Equal universal suffrage and majority rule are the only self-regulating and self-preserving mechanisms which have been discovered as yet for harmonizing conflicting interests in governments; they are the safety-valves of society. Theoretically, there is danger that majority rule may end in tyranny over minorities, but the social instincts of justice and fair play are wide-spread among men, and experience has generally shown that in the long run majorities may be counted upon to be just to minorities that play fair. The more intelligent members of society always have an immense advantage over the more ignorant, and even in a

genuine democracy the danger is not so much that ignorant and venal majorities may oppress the better elements in society, as that intelligent but unscrupulous minorities may exercise tyranny over the mass of the people in spite of their numbers.

Majority rule would level society down to general mediocrity were it not for the instinct of the people to follow leaders. Modern democracy is not the rule of the people as a whole, of ignorant masses, of "the blind god of numbers." A democracy, no less than an autocracy, is a government by leaders, but in the former case these leaders are chosen by the people and are responsible to them and in the latter they are not. Leaders in a democracy have great power, and in crises such as war, their powers may be temporarily greatly increased, but they are not autocrats, for they must render to the people an account of their stewardship. In no modern form of government do the people as a whole make plans for war or peace, for taxation or legislation or even party platforms. These things are determined by leaders, and in general the mass of the people hold them responsible only for results. Government, no less than personal behavior, proceeds by the principle of "trial and error," and the majority in a democracy decide only whether the results are failures or successes. Furthermore a democracy is much more sensitive to this test than is any other form of government,

for a failure is quickly abandoned and its authors repudiated. The contrast between democracy and autocracy is not between "numbers and rightness," but it is between rightness as measured by the effect upon the majority or on only a small minority of the people.

This necessity for leaders emphasizes the importance of the individual in human society. In insect societies a single individual counts for little, except in the case of the queen, upon whom the reproduction of the colony depends. But in human society progress, and even survival, depends upon capable leaders. A leader of incalculable value may be potential in a boy or girl of humblest birth. Society should see to it that every individual is given the chance to bring out the best that is in him. Hereditary castes of workers, soldiers, kings, and queens are well adapted to ant societies in which individual leadership counts for little, but they are fatal to the highest welfare of human society where individual leadership is all-important.

One of the charges which has been brought against democracy is that it fails to develop capable leaders. For example, Cram* says: "Democratic government for the last twenty-five years has neither desired nor created leaders of an intel-

* Cram, Ralph Adams. "The Nemesis of Mediocrity," Boston, 1917.

lectual or moral capacity above that of the general mass of voters, and when by chance they appear they are abandoned for a type that is not of the numerical average but below it, and the standard has been lowering itself for a generation."

Means* quotes this approvingly and points out that our people are showing a general decay of morals. He says he has seen, in a certain Eastern city, "young men and women, who had ancestors among that splendid group of men who signed the Declaration of Independence, acting like drunkards and prostitutes"; and he attributes this lower tone of morals to "the newcomers whose origin was in heaven knows what gutter."

Every period has its Jeremiahs, who get joy and satisfaction from pointing out how much worse this degenerate age is than the "good old times" of the past. To some people the sunset of yesterday was much more beautiful than the sunrise of to-day, and this is especially true of those who never get up to see the sun rise. Is there not every reason to believe that coming generations will look upon Roosevelt and Wilson as this generation looks upon the great political leaders of former times? And as to the moral degeneration of those descendants of the Signers, is it certain that the young blades of the Revolutionary period drank less alcohol and led more chaste lives than those of the present

* Means, *loc. cit.*

day? And does it seem probable that these descendants of our first families were led astray by "gutter-born" immigrants, generally poor, ignorant and hard-working?

Such condemnations of the present, as compared with the past, are not critical nor judicious. They are an expression of emotion rather than reason, of sentiment rather than evidence. They are characteristic of those who see in history a record of deterioration rather than of progress, who place the golden age in the distant past and engage in ancestor-worship. But the evidences of social and moral progress are all about us, and those who take the long view of human history will not mistake marginal eddies for the main stream.

The greatest danger that confronts democracy is not its lack of specialization, its slowness and inefficiency, its levelling down to mediocrity, or its lack of capable leaders, but the fact that unscrupulous leaders may pervert and misdirect the normal social instincts of the people in order to accomplish selfish and partisan purposes. During the war there was a wide-spread and highly organized cultivation of emotions of hate, suspicion, chauvinism. In some instances leaders, newspapers, and organizations did their best to work the people up to a frenzy, little realizing or caring how dangerous this process is. At present a similar propaganda is being waged against Japan and Mexico, and unless it

can be met by reason and common sense it will in time get beyond peaceful bounds. It is this appeal of unscrupulous or ignorant leaders to primitive instincts and emotions rather than to reason which makes possible blind prejudice and hatred between classes and races and nations; it is this which provokes wars and destroys peace and progress.

There are, so far as I can see, but two possible remedies for this most serious condition, and these are, first, that leaders shall always be honest and intelligent, a condition which we can probably never hope to attain, or, second, that the people as a whole shall be educated so as to appreciate the difference between evidence and emotion, science and sentiment. Sensationalism, emotionalism, irrationalism are the greatest dangers that threaten democracy and even civilization itself, for they are a direct return to barbarism, savagery, and prehuman conditions. Our most dangerous enemies are within and not without, and they are the forces of unreason.

In the midst of such a revival of nationalism and patriotism as the world has rarely experienced, we ought not to forget that "above all nations is humanity," that love of man is more fundamental than love of country; that the only things that make patriotism glorious are service and sacrifice; that love of country means more than love of "rocks and rills" and "templed hills," more even than

love of forms of government; that it means in fact love of our fellow men, and that patriotism, social harmony, and the spirit of humanity are grounded upon democratic fraternity.

CONCLUSION

CAN democracy save itself from the serious faults and dangers which threaten it? Can the people, as a whole, be trusted to choose wisely their leaders and policies? Can the democratic ideals of liberty, equality, and fraternity bring about that rational co-operation upon which the further progress of society must depend? No man can now answer these questions with certainty, but at least it can be said that no other system of social organization which has yet been tried holds so much promise of success.

The rational powers of the masses of mankind are not very great, and if the success of democracy depended upon human reason alone the prospect would not be very encouraging. Although Lincoln's saying is true that "You can fool all of the people some of the time, and some of the people all of the time, but you cannot fool all of the people all of the time," nevertheless if a majority of the people can be fooled most of the time the outlook for future democracy would not be very bright, if progress depended solely upon the rational powers of mankind.

But the firm foundations upon which democracy rests go deeper than the intellect and reason of

man; they go down to the instincts and emotions and moral judgments which underlie all social evolution. Upon these foundations the rational organization of society stands as a splendid but still insecure superstructure.

The moral judgments of men may be no better than their practical judgments, but judgment which is founded upon much experience, even if it be based on so low a level as "trial and error," is generally sound. Out of the conflict of opinions and ideals of multitudes of persons in all walks and circumstances of life there comes at last a compromise or adjustment which we call "common sense" and which has the pragmatic quality of viability.

Although we cannot always trust the rational processes of the people as a whole, it is the creed of democracy that we can trust their social instincts and moral judgments. Their instincts of service and sympathy, and their judgments as to right and wrong, as to justice and injustice, are the bases upon which the ideals of liberty, equality, and fraternity rest. These instincts and judgments are so deep-seated and so wide-spread, that they form a firm foundation for democracy.

All students of mankind have based their hopes of democracy upon these instincts and judgments, and no one has expressed this thought more forcefully than President Wilson. In his address at Independence Hall on July 4, 1914, he said: "The

way to success in this great country, with its fair judgments, is to show that you are not afraid of anybody except God and his final verdict. If I did not believe that, I would not believe in democracy. If I did not believe that, I would not believe that people can govern themselves. If I did not believe that the moral judgment would be the last judgment, the final judgment in the minds of men as well as the tribunal of God, I could not believe in popular government. But I do believe these things, and, therefore, I earnestly believe in the democracy, not only of America, but of every awakened people that wishes and intends to govern and control its own affairs." And in his address to the American Bar Association on October 20, 1914, he said: "You cannot go any faster than you can advance the average moral judgments of the mass; but you can go at least as fast as that, and you can see to it that you do not lag behind the average moral judgments of the mass. I have in my life dealt with all sorts and conditions of men, and I have found that the flame of moral judgment burned just as bright in the man of humble life and limited experience as in the scholar and the man of affairs." Upon these instincts and judgments which are deeply planted in the nature and heart of humankind rest the present successes and the future hopes of democracy.

These, then, are some of the reasons why we love

democracy and are willing to defend it against the pretensions of autocracy: because it is the most natural and reasonable, because it is the most free and just, because it is the most humane and peaceful system of government which has yet been tried by man.

III

EVOLUTION AND RELIGION

I

THE NATURE OF RELIGION

SCIENCE contributes to society knowledge and power; government establishes order and justice; religion cultivates faith, hope, and love. The appeal of science is chiefly to reason, of government to action, of religion to emotion. The instincts and emotions of men are older and more powerful than their reason and correspondingly the appeal to emotion is more potent than the appeal to reason. Indeed, reason itself can be appealed to only through intellectual feeling or desire for truth. The highest types of religion appeal to the love of truth, of beauty, and of goodness, that is, to the noblest *emotions* in human nature.

Ryland says: "Thoughtful people get too much in the habit of thinking that intellect is everything. Yet the world is governed not by thought but by emotion." And on this subject Ribot, the French psychologist, says: "What is *fundamental* in character is the instincts, impulses, desires, feelings, all these and nothing else." "Men are not governed by abstract principles," said Leslie Stephen, "but by passions and emotions." Herbert Spencer said, "Mind is not wholly, or even mainly intelligence; it consists largely and in one

sense entirely of feelings"; and August Comte said: "Affections, propensities, passions are the great springs of human life."

This is the great truth which religion has ever emphasized: out of the heart, that is, the emotions, are the issues of life (Prov. 4:20); As a man thinketh in his heart, so is he (Prov. 23:7). This moral and emotional part of man's nature, as contrasted with his mind or intellect, is what is usually called the *soul.*

In general instincts and feelings are as perfect in the higher orders of animals as in man; emotions and desires have an intellectual component and consequently are limited to the highest animals and are most highly developed in man; reason alone, that is, the power of generalization and, abstract thought, is wholly limited to man.

A. Cosmic Mysteries

Reason and consciousness have disclosed to man a vast and mysterious universe, in which there are stupendous forces and processes which he but dimly apprehends and the meaning and purpose of which he cannot understand. In this vast universe individual men, the whole human race, the earth and solar system are but atoms and motes floating in infinite space. Generations, ages, eras come and go; living, feeling creatures rejoicing in their strength and fond of life swarm over the earth

and go down to inevitable death and extinction, leaving only their skeletons as memorials of them; human beings, fearfully and wonderfully made, gifted with intelligence and reason, with the keenest love of life, fear of death, and highest hopes and aspirations, appear by millions, rejoice and struggle and suffer for a brief period and then die and leave only their bones and implements behind. The inexorable system of nature seems to move on like a colossal Juggernaut, unheeding the victims that lie in its path. Complex forms of society—tribes and states and great empires—arise, flourish for a period, and then decay and disappear, leaving only vast monuments as evidences of their greatness and pride and power.

In the midst of this incomprehensible universe, in the presence of these illimitable powers and inexorable laws of nature, in the onrush of this universal holocaust puny man stands bewildered and wonders what it all means.

B. The Problem of Evil

Reason and consciousness have also revealed to man alone a vast problem of evil. Animals are not tortured with mental and moral suffering and they live chiefly in the present without fear as to the future or remorse for the past. Man on the other hand has eaten of the fruit of the tree of the knowledge of good and evil. He suffers

not merely from physical pain but much more from mental and moral anguish. Through his memory, imagination, and reason he lives not merely in the present, but also in the past and future. And although this larger life increases his joys it multiplies his woes. Burns has immortalized this difference between animals and men in his poem "To a Mouse":

> "Still thou art blest, compared wi' me!
> The present only toucheth thee:
> But, och! I backward cast my e'e
> On prospects drear!
> And forward, though I canna see,
> I guess and fear."

Who will say that those greatest and most distinctive of human traits, reason and consciousness, have not been purchased at a fearful price? They have revealed a world of evil as well as of good—a world of struggle and failure, of suffering and sorrow, of injustice and selfishness, of disappointment and despair—a world of war and pestilence and death; a world in which the innocent suffer as well as the guilty, in which unborn babes suffer for the sins of their fathers, in which evil is often rewarded and good punished; a world in which nature is "Red in tooth and claw with ravine," in which diseases and parasites of the most devilish ingenuity prey upon all living things, in which all higher animals are born in pain, brought

up with measureless care and trouble, live a life in which struggle and suffering are mingled with brief satisfactions and joys, and without a single exception go on to inevitable decay and death.

And as if these natural and unavoidable evils were not enough, man has taken what seems to be an almost infernal delight in perpetrating and imagining others. He has outdone the brutes in brutality and the beasts in bestiality. He has invented more cruel tortures and has imagined worse horrors than any known in nature. In his ignorance and superstition he has peopled the world with demons, evil spirits, and witches, and he has extended these imaginary horrors to a future life of eternal torture.

Is it any wonder that sensitive souls who have brooded over these horrors have cried out against them, that they have found this world of evil intolerable and have been compelled to seek some way of relief?

C. The Inner Conflict

Furthermore, we are aware of the fact that disharmony and evil are not only around us but in us. We are urged to different courses by conflicting desires. Hate battles with love, selfishness with altruism, passion with reason. The moral and social codes forbid many things which we desire and prescribe things we would avoid.

"Huxley held that the spirit of ethics was opposed to the spirit of evolution. Metchnikoff finds these disharmonies due to the survival of bestial instincts in man. Galton finds the sense of sin to be due to the fact that the development of our inherited nature has not kept pace with the development of our moral civilization. Our psychical, social, and moral environment has come down to us from the past with ever-increasing increments, every age standing on the shoulders of the preceding one. The aspirations, impulses, responsibilities of modern life have become enormous and our inherited natures and abilities have not essentially improved. Social heredity has outrun germinal heredity and the intellectual, social, and moral responsibilities of our times are too great for many men. Civilization is a strenuous affair, with impulses and compulsions which are difficult for the primitive man to fulfil, and many of us are hereditarily primitive men. The frequent result is disharmony, poor adjustment, a struggle between primitive instincts and high ideals with a resulting sense of discouragement and defeat, which often ends in abnormal states of mind. The prevalence of crime, alcoholism, depravity, and insanity is an ever-increasing protest and menace of weak men against high civilization."*

In memorable words Paul describes the "law in my members warring against the law of my mind and bringing me into captivity to the law of sin which is in my members," and he cries out: "Oh, wretched man that I am! Who shall deliver me from this body of death?" (Romans 7:23, 24.)

D. The Function of Religion

All men everywhere have desired to be in harmony with the superhuman powers and processes

* Conklin. "Heredity and Environment," 1920, pp. 242–243.

which surround them; they have tried to avoid pain and evil and to find happiness; they have sought inner peace in place of conflict. In addition to this, intelligent men have sought for a rational explanation of these great mysteries and problems which would satisfy their reason, and harmonize their emotions; which would make them feel at one with cosmic processes, with society, and with themselves. They have sought, in short, to adjust or adapt themselves to their environment whether it be the personal environment, inner or outer, or the cosmos.

The most intelligent types of men may find relief from "Fightings within and fears without," in science or philosophy, but the great mass of mankind in all ages and countries have found relief in religion. Religion enables thoughtful and sensitive persons to face evil, fears, suffering, and death with hope and courage. It covers the hideous aspects of nature with the mantle of divine love and purpose. It makes life tolerable to those who would find it otherwise intolerable. It helps to control the antisocial and brutish instincts of men and it cultivates faith, hope, and love. Its great hold on the race is due to the fact that it ministers in the highest sense to human comfort and happiness.

The scientist worships truth, the artist beauty, and every moral person goodness. Religion com-

bines the worship of the true, the beautiful, and the good. The person who loves these is religious, it matters not what his professed creed may be. The irreligious man is the one who does not love the true, the beautiful, and the good—even though he may profess a noble faith and may breathe out threatenings and slaughter against those who differ from him.

The great power of religion in every stage of human history bears witness to the fact that life is not merely thinking and doing, but feeling also, and that religion answers to a real human need. We shall never outgrow our need of religion, as we shall never outgrow our need of government and science, though we have outgrown many faiths and creeds in science and government, as well as in religion, and shall probably outgrow many more.

II

THE EVOLUTION OF RELIGION

As the study of comparative anatomy and embryology must inevitably have led to the doctrine of organic evolution, so the study of comparative religions must necessarily have led to a recognition of the fact of religious evolution. In this country at least, the wide recognition of the fact that there is much in common and much of value in all religions dates from the World's Parliament of Religions in 1893. Those who were then and there stimulated to study other religions came to see that many fundamental doctrines of Christianity go back to remote sources.

It is not my purpose here to discuss in any detail the evolution of religion. This is a subject which has been dealt with by some of the greatest students of world religions who have shown that religion, no less than social organization and human intelligence, has undergone an evolution from the primitive beliefs and practices of savage tribes to the lofty teachings and ideals of Christianity. This evolution is nowhere better illustrated than in the Old and New Testaments, where the record of the religious development of the Jews is traced from the primitive faith and customs of semi-

barbarous tribes to the highest ideals of religion and morality that the world has ever known.

Buckle thought that intellect is the great moving force of history and that emotions are static. Certain it is that emotions and instincts are far more static than knowledge, just as physical inheritance and evolution are more static than social inheritance and evolution. When one considers the utter anachronism presented by the survival of primitive or even savage ideals of religion, not only in an age of general enlightenment but even in persons of high intelligence and culture, it is only too easy to believe with Buckle that emotions and religion are static. When one reflects on the fact that for nineteen centuries so great a part of the world that professes to be Christian has remained heathen at heart and that to-day the teachings of Jesus are generally regarded by his so-called followers as too lofty to be practical we may well wonder whether mankind is making any progress in religion. Erasmus gave the ignorant, emotional religion of his day only fifty years before it should become extinct; Voltaire thought that for all intelligent persons the old religion was already extinct; but in spite of notable advances in education, general information, and social organization the "old-time religion" of emotion as opposed to reason, of dogma rather than of works, still persists.

But emotions and religions, like physical organization and instincts, do undergo slow changes in the course of centuries. The long view shows that here also there has been evolution and progress. If there has been an evolution of intellect and of society, it follows necessarily that there has been evolution in man's conception of religion, for even if the doctrines and commands of all religions were supernaturally revealed, those revelations must have been adjusted to the stage of evolution to which men had arrived. In his address on Mars' Hill in Athens, Paul clearly outlined this development of religion from fetichism and idolatry to the worship of "Him in whom we live and move and have our being." (Acts 17:22–31.)

Primitive religions are almost entirely emotional and are based largely upon fear. Goethe described primitive religion as "fear without reverence." In the lowest grades of savagery the object of worship is some external thing. Family or tribal gods are identified with animate or inanimate objects which are the possession of the tribe. These fetiches are cherished and treated with ceremonies in order to bring good luck. In a slightly more advanced state of savagery the external object is the symbol of the god rather than the god himself; it is the "idol," which means the thing seen, and stands for the unseen god.

The savage worships this idol or the god sym-

bolized by it and makes sacrifices to it in order to propitiate it and to get it to fight for him and to do his will. Even in modern religions there is a large element of fetichism, as witness the adoration of wax figures, bones of saints, sacred relics, and the like. The fact is that many members of civilized society are, intellectually and morally, still savages and their religion is still fetichism. Caird* says: "The spirit of fetichism is the dark shadow which accompanies religion in every stage, from the savage who makes presents to the medicine-man of his tribe up to the Christian who prays, not that God's will may be done, but that God may be got to do his will."

Family and tribal gods were believed to be the ancestors of the tribe, even though they were animals or inanimate objects, and the tribe was frequently named from its tutelary deity and was supposed to partake of his nature. These deities fought and wrought for the good of their tribes and against all enemies. Survivals of such beliefs may sometimes be found even in modern nations, as, for example, in the recent war-time invocations to "Our good old German God."

A higher type of religion rising above belief in tribal gods is found in the worship of the heavenly bodies and of the elemental powers of earth and

* Caird, Edw. "The Evolution of Religion," Glasgow, 1893, vol. I, p. 225.

sky and sea. This is one of the earliest types of religion of civilized and semi-civilized nations—of Egypt, Assyria, Greece, India, Persia, China, Peru, and Mexico. Whereas the idea of tribal gods led to belief in multitudes of minor deities, the worship of nature, and especially of the heavens, tended to reduce the number of these deities. "The physical universalism of the heavens . . . is thus the first form in which the idea of a universal God, a God who is above, though not as yet exclusive of all others, presents itself to the spirit of man. . . . The physical universality of the heavens was the stepping-stone upon which the religious mind of India rose to the abstract universality of thought, the Absolute Being in which everything else is lost. This pantheism is the final outcome of polytheism, the fatal gulf that must ultimately swallow up all merely objective religions." *

A still more advanced type of religion is found in anthropomorphism or homotheism, in which the object of worship is a greater and more perfect man. This is a recognition of the fact that the mind and soul of man are the highest and most worthy objects in nature, that they far surpass in complexity and significance the most stupendous phenomena of the material world. There is thus a reason for the fact that in endeavoring to endow his gods with the highest and noblest qualities

* Caird, *loc. cit.*, pp. 255–258.

man should have made them in his own image. Owing to the difficulty of imagining the combination of the superlative manifestations of all human qualities in one object of worship, these qualities were distributed among many gods, and thus we get the numerous anthropomorphic gods of Egypt, Assyria, Greece, and Rome.

Finally the external objects of worship, whether fetiches, idols, forces of nature, or gods in human form, are abandoned for a subjective religion of thought. The material object is sublimated and etherealized; the forces of nature and the aspirations of man are combined in a universal and eternal spirit, all-powerful, all-wise, and all-good. And yet this sublimated idea of God combines the best elements of earlier and more primitive religions, for religious systems, like scientific or governmental ones, evolve by absorbing, recombining, and elaborating earlier forms and ideas.

An element of ethics or morality is found in all religions, even the most primitive, but it becomes a leading principle in only the most advanced types of religion. It is sometimes said that ethics is entirely lacking in primitive religions and yet this is not strictly true, for although the family or tribal god may be a demon to other tribes, he is the patron and protector of his own particular tribe. There is ethics in such a religion, but it is a small and narrow kind of ethics, and only in the course

of long evolution has it grown to include other tribes and races and nations; and correspondingly it was only in the course of long development that the God of Abraham, Isaac, and Jacob came to be regarded as the Lord of all the earth and the Father of all mankind. "Religion," said Matthew Arnold, "if we follow the intention of human thought and human language in the use of the word, is ethics heightened, enkindled, lit up by feeling; the passage from morality to religion is made when to morality is applied emotion." The evolutionary view of religion would reverse the process here described and teach that to the emotions of primitive religion there was in course of time added ethics and morality.

The fact of the evolution of religion is held by some to destroy its value and significance, but one might as well hold that the development of the individual destroys the value of personality or that the evolution of man destroys his unique superiority over all other creatures. The significant fact with regard to the race, personality, or religion is not what they begin with but what they lead to and what they end with. All forms of development are marvellous, miraculous if you please, but they are none the less facts. From the minute and relatively simple egg cell develops the complex body, the instincts, and the mind of man; from primitive protoplasm has developed all the

multitudes of living things which inhabit the globe, including man, the paragon of animals, the climax of evolution; from the earliest forms of society, namely the family and tribe, have developed all the complexities of modern civilization; from the primitive faith of the child or the savage has developed the highest type of religion and ethics that the world has ever known. Such development is a fact which cannot be successfully denied; but though we may recognize its steps and stages, we cannot fully explain its causes. The mystery of mysteries is how the egg cell or the original protoplasm or savage society or primitive religion came to contain all the marvellous potencies of development which they possess.

The various stages and phases of religion represent different attitudes of mind toward the fundamental problems of existence, such as the origin and government of the universe, the constitution and order of nature, the origin and character of man and of society, and especially the mysteries of human life and death, of good and evil, of instincts, emotions, intelligence, and consciousness, as well as the aspirations and ideals of individuals and of society. The type of religion which one holds is the reflection of his beliefs regarding these fundamental things. Caird* says, "A man's religion is the expression of his ultimate attitude to the uni-

* Caird, *loc. cit.*, p. 30.

verse, the summed-up meaning and purport of his whole consciousness of things. . . . In short it is the highest form of his consciousness of himself in his relation to all other things and beings; and if we want a brief abstract and epitome of the man, we must seek for it here or nowhere."

In this sense religion is a personal matter; every man has his own religion, however irreligious it may seem to those whose attitude to the universe is different from his own. In this broadest sense religion includes a man's entire personality, his intellect, emotions, will; his thoughts, aspirations, activities.

But in religion, as in everything else, mankind has desired uniformity. A purely personal religion may be good enough theoretically, but practically it fails to accomplish much of a lasting nature for human society. Because of the greater power and permanency of society, as contrasted with the individual, all types of religions have established organizations, such as churches, schools, charitable institutions, even governments; and they have developed bodies of belief such as doctrines, dogmas, and creeds.

III

THE CONFLICT BETWEEN THEOLOGY AND SCIENCE

BETWEEN religion and science there can be no other conflict than such as may arise between emotion and reason, between faith and knowledge. But between the science which deals with religion, namely theology, and the sciences which deal with various aspects of nature, that is, the natural sciences, there have been many conflicts. When one considers all types of religion and theology, it is evident that there have been many conflicts not only between these religious systems and science, but also between them and the highest types of art and morality. However, we are here concerned primarily with the conflicts between natural science, and especially biological science, and Christian theology.

In the interests of uniformity of belief religious bodies have prescribed many intellectual, scientific, and philosophic systems and have claimed for them divine sanction and revelation, whereas all other knowledge might grow from more to more, such revealed knowledge was held to be perfect from the first, and where it came into conflict with science, so much the worse for science.

But so far as scientific doctrines are concerned no sane person now attempts to prove or disprove them by appealing to theology or the Scriptures; they stand or fall on scientific evidence only. Religious philosophy, on the other hand, is based chiefly on human needs and desires and here even more than elsewhere the tendency is to believe that which one *desires* to believe, and to adopt a faith which will satisfy the emotions but which may not satisfy the reason. And yet religious philosophy to be of any comfort or value must be sincerely believed. It must satisfy the reason as well as the emotions, and to this extent it must be consistent with one's knowledge of nature and of man. Consequently religious beliefs and doctrines cannot stand still when all other knowledge is advancing. The faith of childhood or of the childhood age of the race will not satisfy more mature stages of development, and it would be strange if the theology of a pre-scientific age did not now and again clash with advancing knowledge.

Almost all general ideas are expressed in terms of sense impressions; they are material pictures or images which in the course of time have come to stand for, or to symbolize, some more immaterial concept. This is true of all our thinking, but it is especially true in the field of religion. Religious thinking, expression, and instruction is almost entirely in the form of symbols. Much of our lan-

guage on this subject is symbolic, as, for example, "spirit" meaning breath or wind, "heaven" meaning that which is elevated, etc., and practically all of the forms, ceremonies, and ordinances of religion are symbols. The presentation of spiritual thoughts to immature minds must be in the form of sensory objects, and especially of visual images. Hence God, the spirit of truth and beauty and goodness, becomes the "Good Man," the general spirit of evil becomes the "Bad Man," heaven becomes the Celestial City with streets of gold and gates of pearl, etc. To insist that these and many other religious symbols, metaphors, or allegories shall be accepted by mature minds as real, material entities rather than as symbols is like requiring grown-up people to "believe in Santa Claus" as a real, physical personality rather than as a symbol of the spirit of Christmas—the spirit of good-will and service and love. The symbolism of religion is wonderfully rich and deep, and it is capable of appealing to all grades of intelligence and experience from the child to the sage. On the other hand, a literal interpretation of these symbols is not only impossible for mature minds but it destroys their deeper meaning. "The letter killeth, the spirit maketh alive." More than anything else, it is extreme literalism in the interpretation of religious symbols which has caused the conflict between science and religion.

It is not possible to quiet this conflict by "taking the reason captive," as has sometimes been advised, nor is it possible to save an outgrown theology by stopping the advance of science or by discrediting its conclusions. It is not possible to satisfy mature minds with a primitive religion suited only to children, and the attempt to do this can only result in forcing thoughtful persons into an attitude of hostility to religion. The modern world has outgrown the primitive religions of tribal gods whether those of the Philistines or the Israelites; it has outgrown the idea of national gods whether of Egypt, Greece, Rome, Germany, or America; it has outgrown the cosmogonies of the Babylonians and the science of the earliest stages of civilization, and it is just as impossible to force the modern mind back into these primitive beliefs as it would be to force the mature man back into the egg from which he developed.

Much harm has come to religion through pious attempts to oppose the advance of science by unscientific methods. Through many dark ages the Christian church served as the intellectual as well as the spiritual guide of men and it is not surprising that with the dawn of a brighter era it should still have striven by its old methods to maintain its intellectual leadership; but the time has forever passed when scientific questions can be settled by an appeal to theology. The world no

longer looks to the church, as it once did, for intellectual leadership. The time was when not only the pulpit but also the great seats of learning were the schools of the church. To-day we hear much of the loss of influence on the part of the pulpit and it is notorious that in the great universities the church has lost control. The remedy for this condition is not to be found in increased zeal but in increased wisdom. Why should the church claim for itself authority in matters of science? If false doctrines are taught by science, and no doubt many are, science will furnish the cure. The only remedy will be found in more exact methods of inquiry, in more laborious investigations; it can never come through resolutions of church councils, general assemblies, or even papal anathemas.

It is the duty of the church to relate itself to present-day problems, to present-day methods, and knowledge, but it is not its duty to become sponsor for scientific doctrines. It is as certainly a mistake for the church to stake everything upon the latest doctrine of science as upon the oldest—though not so fatal a mistake. The advice of Gamaliel is still good advice: "Refrain from these men and let them alone: for if this counsel or this work be of men, it will come to naught: but if it be of God ye cannot overthrow it: lest haply ye be found to fight against God." The logic of

events will try all doctrines; natural selection will ultimately weed out the unfit in science and religion, as well as in the physical, intellectual, and social worlds.

It is the truth after all which all sincere men desire. God cannot be concerned that men should believe anything which will not bear the most searching investigation, and why should those who claim to be his ambassadors be fearful of this test? The truth is more to be desired than any form of doctrine or dogma. In all science the great article of faith is this, "Truth is mighty and will prevail." We may be sure of the ultimate triumph of the truth, whatever may become of your doctrine or mine; and further we may rest assured that there is no short cut to truth, no royal road, no way to save men from temporary error. "Prove all things, hold fast that which is good" is the only rule. This being so, the one fatal thing is not error but bigotry, not smallness of knowledge but smallness of will and purpose and soul, not disbelief in doctrine but distrust of truth and reason and nature. In short the one thing to be desired by church and state, by society and individuals is not perfect truth nor a panacea for all human ills but openmindedness, sincerity, and sanity.

Strictly speaking, science and religion deal with different subjects. The substance and purpose of science is knowledge; of religion, faith and con-

duct; the organ of science is primarily the intellect, of religion the emotions and the will; the goal of science is mechanism, of religion spirit. And yet as man himself is a unity and cannot in reality be divided into body, mind, and soul, so science and religion are, or should be, expressions of this unity acting in co-operation and not in antagonism:

> "Let knowledge grow from more to more,
> But more of reverence in us dwell,
> That mind and soul according well,
> May make one music as before,
> But vaster."

IV

NATURE AND THE SUPERNATURAL

THE centre of the conflict between science and theology is naturalism vs. supernaturalism. Almost every religion claims to have had a supernatural origin, to have been made known to men by supernatural revelation, to be attested by supernatural miracles, to influence the lives of men in a supernatural manner and to lead to supernatural rewards or punishments in a future supernatural life. On the other hand, science has found that so many things which were once regarded as supernatural are due to natural causes that it assumes that all phenomena will ultimately be found to be natural, either by showing that they can be explained by laws or principles already known or by other laws at present unknown and perhaps unsuspected.

Professor W. K. Brooks once said, "The idea of the supernatural is due to a misunderstanding; nature is everything that is."* It is worth our while to consider briefly what is meant by these terms, for the conflict between science and religion is caused

* William Keith Brooks Memorial Meeting, *Johns Hopkins University Circulars*, 1909.

largely by this misunderstanding. Bishop Butler in his "Analogy of Natural and Revealed Religion" defines natural as "that which is stated, fixed, settled," and Charles Darwin put this quotation from Butler opposite the title-page of his book "On the Origin of Species." The supernatural is that which is either opposed to nature in that it is not stated, fixed, settled, and hence is capricious or accidental, or it also is natural, though we may not at present recognize the order, system, and laws which lie back of it.

A. Popular Misconceptions of Nature and the Supernatural

Many things were once supposed to be due to supernatural causes which are now known to be wholly natural. Primitive conceptions of the universe represented everything as supernatural in the sense of being due to the will or caprice of the gods. The most regular and usual happenings such as the course of the sun through the sky, the rising and setting of sun and moon and stars, the winds and waves, thunder and lightning and storm were the direct acts of certain deities. And much more were extraordinary happenings, like earthquakes, volcanic eruptions, comets, eclipses, and floods, attributed to the anger of the gods. However, such phenomena were in time shown to be the natural results of natural causes, and intelli-

gent persons no longer regard them as supernatural though they inspire awe and reverence as much as they ever did.

No one now maintains that such phenomena in the inanimate world are supernatural, but the universality of law and system in the living world is not so generally admitted. In particular the psychic phenomena of animals and especially of man have appeared to be more than natural. The usefulness and fitness of many instincts and emotions, the truly marvellous qualities of memory and intelligence, the freedom and power of the will have long seemed to prove that the mind and soul are supernatural. And yet psychology reveals the fact that the mind no less than the body is subject to natural laws, and that our thoughts and wills and emotions are not as free and capricious as we sometimes think, but that they also are ordered and natural.

We are conscious of the fact that we can by taking thought modify our behavior; we can choose to do or not to do certain things and under strong stimulus we can force ourselves to do such extraordinary things that the belief has arisen that the will is absolutely free; that it is an uncaused cause, which stands apart from and outside of nature. But careful examination shows that this belief is untenable and untrue. We know that in many cases our choices are determined by causes, such

as instincts, emotions, experiences, thoughts, examples, admonitions, ideals; and in all cases a study of our own behavior, as well as that of others, shows that our acts are never uncaused. Our acts and choices are determined by many causes, some of which are external and others internal; they are not absolutely fixed but are more or less plastic; they are not lawless and causeless, but, on the other hand, they are not rigidly prescribed; they illustrate scientific determinism but not fatalistic predeterminism.* The fact that a science of psychology is possible proves that there are principles or laws in the psychical as well as in the physical world, and that in this sense mind and soul are natural and not supernatural.

But even if the phenomena of the living world are not supernatural they are so complex and wonderful that some philosophers maintain that they are not capable of being explained as the results of mechanistic natural causes. Consequently they maintain that life must include some undefined and inexplicable energy or entity such as vital force or entelechy, which if not supernatural, is at least not mechanistic or casual in its action. They maintain that mechanistic explanations of life are never complete, whether with regard to ordinary physiology and development, or to regulation and regeneration after injury, or to animal behavior and

*See Conklin, "Heredity and Environment," chap VI.

evolution. In all of these processes living things act as if they were guided by intelligent purpose, or as if the end were in view from the beginning. However, a detailed and experimental study of many of these vital activities shows that useful and apparently purposive actions are the outcome of the elimination of many useless responses and the preservation and continuance of useful ones, and experimental biologists are well-nigh unanimous in the opinion that the phenomena of the living world no less than those of inanimate nature are not only natural but that they are also causal and mechanistic.

However no scientific or mechanistic explanation of anything is ever complete. No one can explain the properties of water by its chemical composition, and yet we have reason to believe that those properties are indissolubly associated with that composition; no one can completely explain any function of a living thing in terms of its structure, or any structure in terms of function, and yet we know that they are invariably associated. The fact is that structure and function, body and mind, brain and consciousness appear to be two aspects of one thing—namely, organization or life—and neither can be fully explained in terms of the other.

In the union of chemical elements properties appear which could never have been predicted from the properties of the elements, as, for example, in

the union of hydrogen and oxygen to form water; and in the combinations of vital units new properties arise which were not present in the units. This latter process Bergson calls "creative evolution," but it is not fundamentally different from the similar process in chemistry which is known as "creative synthesis." If a mysterious principle called "vitalism" is necessary to explain the properties of life, similar reasoning should lead one to attribute the peculiar properties of water to "hydrism" or of light to "photism."

It seems unfortunate that those who are concerned chiefly to prove that no scientific or mechanistic explanation is ever complete should thus contrast the phenomena of the living and the not living worlds and attempt to build up a distinction that is not only indefensible but is worse than useless, since it logically leads to the view that the essential factors of biology, as contrasted with all other sciences, are forever beyond the reach of scientific investigation. Both animate and inanimate nature are full of mysteries, and none of our so-called "explanations" ever reach to the heart of things, but it is evident that both the living and the lifeless belong to the same universe. After all, the principle which the advocate of natural religion is concerned to prove is not vitalism but teleology, and while the latter is strikingly exhibited in organisms, it is not confined to these alone, but is

found in the whole order and system of nature, as we shall see in a later section.

Little by little all sorts of mysterious phenomena which were once considered supernatural have been shown to be natural, and everywhere supernaturalism has been losing ground and naturalism has been gaining. But there is still a wide-spread belief among people, who have not appreciated the significance of this fact, that while ordinary events occur according to nature, nevertheless natural laws may from time to time be set aside or abrogated and supernatural phenomena may be interposed among natural ones. In this conception, nature is only that which is ordinary and usual, while that which is extraordinary or unusual is supernatural.

There are still large areas in which popular belief in the supernatural prevails, and from time to time revivals of this belief carry us back to the conditions of earlier times. To-day a new supernaturalism is abroad in the world as one of the legacies of the Great War. All sorts of supernatural manifestations have been reported on the battle-fields, in the camps, and elsewhere. One recalls the apparition of the Angel of Mons and of the Virgin at Metz, the new interest in spiritism, ouija-boards, and the like. Those who regard such things as supernatural manifestations and not as myths or superstitions do so generally because they desire

to believe in the supernatural, and not infrequently this desire is catered to by conscious deceivers. Fakirs generally have turned largely to the exploitation of the supernatural, and their methods are now quite up to date. The old tricks of table-tippings and spirit-rappings and writing by unseen hands is giving place to telephonic and wireless communications, while ghostly faces are revealed on photographic or X-ray plates. Great emotional crises are peculiarly favorable to such manifestations, whereas in the clear, cold light of reason they fade away as all ghosts do.

The renewed interest in spirit manifestations which has spread over England and America since the war is, in many respects, similar to the belief in witchcraft which swept over different countries of Europe during the Middle Ages, and which lasted in some places well into the eighteenth century. Standing is given to such ignorant superstitions by a few intellectual and scientific sponsors, who can always be found for any novel or sensational belief, whether it be a denial of the laws of causality or of the value of scientific methods, a belief in perpetual motion, clairvoyance, ghosts, miracles, divine healers, or reincarnations. All such beliefs represent a protest against the slow and rational methods of arriving at truth by careful and repeated observations and experimentations, and a belief that by means of authority or inspiration, or occultism or

mysticism, truth may be established more rapidly and successfully than by the slow methods of science. But the history of all such movements in the past abundantly confirms the conclusion that there is no royal road to truth, and no possibility of making real progress in human knowledge except by the slow and laborious methods of science.

But while most persons who have had training in distinguishing facts from fancies, realities from vain imaginings, unite in rejecting these manifestations of "spirits," no one, not even the most crass materialist, can successfully deny the existence of what we call "spirit," meaning by this thought, emotions, ideals, aspirations, and volitions. These are as much a part of human nature as are our blood and bones and brains, but there is not a particle of evidence that they are supernatural; on the contrary they can be proved to be natural, orderly, and causal. The real issue between those who believe in supernaturalism and those who do not is whether anywhere there are satisfactory evidences that such spiritual phenomena are uncaused, undetermined, unlawful. I know of no such evidence.

B. Scientific Conception of Law

During the past three hundred years, and especially during the past century, there has been developing a scientific conception of nature as a

system of eternal, universal laws. According to this view nothing happens in the universe by lawless chance or caprice; even chance and volition have their laws, they also are a part of nature and are "stated, fixed, and settled." This is not to say that nature is lacking in many of the qualities which time out of mind have been ascribed to the supernatural, such as mystery, infinity, and superhuman power. Science indeed has revealed to us a universe that is vastly greater, more wonderful and more mysterious than was ever dreamed of before, but it is an orderly, stable, settled universe and not one of chance or caprice. Usually all that is meant by the word "supernatural" is superhuman or wonderful, and the modern conception of nature has only magnified these qualities.

Of course no scientist in his senses supposes that the whole of nature has been explored or that more than a faint beginning has been made in the discovery of natural laws. "There are more things in heaven and earth than are dreamed of in our philosophy." Many phenomena which are now mysterious and which are sometimes supposed to be supernatural may yet be explained as due to natural processes, but this would only prove that what had been termed supernatural is really natural. Although it is impossible to demonstrate that everything is natural, because everything has not yet been explored, it is true that everything that has

been thoroughly investigated has been found to be natural, and this justifies the conclusion that nature is universal.

Science attempts to classify phenomena, to reduce them to order, to determine the regular succession of cause and effect. It "explains" particular events by showing that they come under general categories or "laws." For example, it is said that the law of gravity explains not only the falling of bodies on the earth, but also the forms and movements of the earth and of the heavenly bodies. But this means only that many different phenomena can be brought into one category. That all material bodies attract one another "directly as their mass and inversely as the square of their distance" is one of the greatest generalizations of science, but it explains only by classifying. It offers no explanation of *why* bodies attract one another in this way. It reveals a mechanism of nature but it does not account for that mechanism.

Science deals only with mechanisms and processes, with the constant relation of cause and effect, with the laws or usual operations of matter and energy and life, with what Euripides called "the unfailing order of immortal nature." In short it studies the mechanisms by which things have come to be what they are, but it cannot explain the origin of these mechanisms nor the purpose which they subserve. It explains the development of an egg

by revealing the steps by which the egg changes into the adult; it explains heredity by the initial constitution of the germplasm; it explains evolution from amœba to man by the original constitution of amœba, or of the chemical elements of which amœba is composed, or of the electrons constituting the elements. In short it pushes back the mystery to earlier and earlier causes but in the last cause studied it leaves that mystery as great and inexplicable as ever.

Philosophy and religion seek to go farther than this and to penetrate the mystery that lies back of the laws and mechanisms of nature. A mechanism or machine, in ordinary usage, signifies an instrument for accomplishing a result and this result is itself the most significant aspect of a mechanism; it is the "purpose" for which the machine exists. Science reveals nature as a vast mechanism, philosophy and religion see in this mechanism a purpose. Science maintains that everything happens according to natural laws; philosophy and religion inquire into the origin of these laws. Science explains all phenomena as natural; philosophy and religion maintain that the greatest of all mysteries is nature.

In the field of science the idea of the supernatural is due to a small and insufficient view of nature. "Nature is everything that is." In the field of philosophy and religion the laws and order and me-

chanisms of nature, which are the ultimate facts of science, themselves require an explanation. Such things are beyond the reach of science and exact knowledge, but not beyond the reach of reason and faith. In conclusion we may say with the scientists that all is natural in that it is "stated, fixed, settled"; and with philosophers and theologians that all is supernatural in that nature cannot explain itself. "The tormenting riddle, eternal and inexplicable, is the existence, not of the universe, but of nature." *

C. Supernaturalism in Religion

In religion only has a general belief in the occasional abrogation of natural laws, and the interposition of supernatural phenomena among those that are natural, persisted to this day. Indeed many persons believe that this kind of occasional supernaturalism is the very foundation of religion, and to them a natural religion is a contradiction in terms. Nevertheless it is evident that the new wine of science is fermenting powerfully in the old bottles of theology.

General belief in a supernatural revelation attested by supernatural miracles and influencing the lives of men by supernatural processes has been undergoing change. The universality of law in the natural world has led men to look for natural

* Henderson, L. J. "The Order of Nature," p. 208.

law in the spiritual world also. Supernaturalism even in religion is a great stumbling-block to those who find naturalism everywhere else; it makes religion not only unnatural but unreal to many. Accordingly we find among scientific exponents of religion a strong current in the direction of naturalism rather than supernaturalism. The conflict regarding the natural and the supernatural is no longer exclusively between antagonists and defenders of religion, it is also between scientific and unscientific defenders.

(*a*) One of the first of these conflicts between naturalism and supernaturalism in religion concerned the completeness and inerrancy of the Scriptures. For centuries their supernatural origin and absolute perfection were stoutly maintained. St. Augustine taught that the Bible contained the sum total of all human knowledge to the end of time. It was sometimes held to be a text-book of all sciences as well as of faith and practice. Such a claim was on a par with that ascribed by legend to the Kalif Omar regarding the Koran, who is said to have declared concerning the great Alexandrian Museum: "If the books agree with the Koran they are useless and need not be preserved; if they disagree with it they are pernicious. Let them therefore be destroyed." The Christian churches have had ages of Bibliolatry, but in this, as in all other similar matters, there can be but one outcome.

The Bible, no less than other books, has been subjected to scientific study and criticism. Such study has shown that it is not a text-book of science and that it is not supernaturally free from errors.

When Galileo was charged with teaching a dangerous and damnable heresy directly opposed to the authority of the Scriptures, it is fabled that he replied, "The Bible was given to tell how to go to heaven, and not how the heavens go." This answer and all that it implies, if once accepted and believed, would go far to quiet the age-long controversy between science and theology. I respectfully submit that when it is attempted to make the Bible teach astronomy, geology, biology, or any other science, the real objects of the Scriptures are lost sight of, the cause of religion is not advanced and knowledge is not increased. If time permitted, I think it could be shown that the history of past controversies abundantly justifies this statement. Those who insist on taking the Bible as a text-book of science, sufficiently complete to establish or destroy any scientific doctrine, have learned little from the history of such claims in the past; they can know but little of the patient, painstaking labors of the scientific investigator, or of the rights of a science in its own sphere.

(*b*) Miracles which were once supposed to prove the existence of the supernatural and the authenticity of religion have become a source of doubt

rather than of faith in this scientific age. Many theologians who have felt the spirit of science explain them as allegories or as natural phenomena not understood by those who witnessed them. And the consensus of intelligent opinion throughout the world is that if supernatural miracles were performed in former times, they do not occur today: "The age of miracles is past."

Many devout believers in the actuality of the biblical miracles seek natural rather than supernatural explanations of them, as, for example, the passage of the Red Sea, the lightnings and thunders of Sinai, the sun's standing still upon Gibeon, Elijah and the chariot of fire, etc. In this connection many Princetonians will recall Dr. Macloskie's explanation of Jonah's having found lodgment in the laryngeal chamber of the whale, where he could breathe, rather than in its stomach where he must have been suffocated. Most persons have heard natural explanations of the feeding of the multitude, the stilling of the tempest, the healing of the sick, the conversion of Paul, and many other New Testament miracles. The eagerness with which people grasp at parthenogenesis as a natural explanation of the virgin birth, or at suspended life and anabiosis as an explanation of the resurrection, shows how profound is the belief in the universality of natural law even in the case of many who believe in the actuality of the phenomena called miracles.

More and more the religious world is turning away from the supernatural aspects of the miracles to the moral lessons which they convey, from a literal interpretation of them to their spiritual significance. More and more all thoughtful people are seeing that nature, rather than the supernatural, is the greatest of all miracles. What can be more miraculous, in the original sense of that word, than the order of nature, the laws of matter and energy, the course of evolution from amœba to man, the development of the human body and mind and personality from an egg? Not without reason did Mahomet, when asked to work miracles, point to the clouds and say, "Those are God's miracles."

V

EVOLUTION VS. CREATION

For centuries science has been engaged in glorifying the commonplace, in showing that natural phenomena are due to natural causes, and that the most stupendous as well as the most subtle phenomena, removed from us perhaps by almost an eternity of time and space, are but manifestations of continuous natural processes which we may see and study for ourselves in the common phenomena of our daily lives. At every step in this process, science has had to contend with intrenched supernaturalism; to our ancestors it was self-evident that extraordinary occurrences required extraordinary causes, and that natural causes were wholly inadequate to accomplish great results. But step by step, before advancing knowledge of nature, supernaturalism retired from the plane of ordinary phenomena until she dwelt only in the misty mountain tops of origins, beginnings, creations; and day by day there was a growing respect for nature and her powers.

Granted that wind and sun and rain, the regular recurrence of the seasons, that human birth and growth and death, and that even normal and abnormal psychoses are natural phenomena, it is

yet contended by many that in the origin of things, and especially in the origin of the living world, the supernatural is supreme. "How we were secretly wrought in the womb," "how the foundations of the earth were laid," how animals and plants and life itself first arose were supposed to be beyond the reach of natural explanation and a sure proof of supernatural creation. But the study of embryology has shown that we were wrought by natural processes, that development, although wonderful, is not supernatural; geology has found that the earth was formed according to natural laws; evolution teaches that the origin and transformations of living things are the results of natural causes.

It is true that science never penetrates as far as the *ultimate* origin and cause of anything. Like those ancient myths which represented the earth as resting upon a tortoise and the tortoise on an elephant, which was ultimately left unsupported, so science traces effects to causes and these to other causes, but in the end leaves the last cause unexplained. Science maintains that so far as experience goes, every event is due to pre-existing natural causes, and it assumes that this chain of cause and effect stretches back *ad infinitum*, though of course this cannot be proven. This chain may end in a first cause, an uncaused cause. But if so we may be sure that science will never be able to discover it, for it lies beyond the reach of finite

knowledge and experience. The ultimate origin of the universe is utterly inaccessible to science. But regarding the proximate origin of the solar system, the earth, the various forms of life upon the earth, and last of all man, there is good scientific evidence that here also nature is supreme, that here also law, continuity, uniformity prevail. So far as we know or can conclude from present evidence, mechanism, law, and order are universal and have been so from all eternity.

In this conflict of science with tradition there have been crises, turning-points, no less important for mankind than any which are associated with the rise and fall of nations; such a crisis was reached when astronomy was emancipated from the thraldom of supernaturalism by Newton and Laplace; when geology was freed by Hutton and Lyell from the absurd cataclysmal theory, which virtually taught that age after age the Creator, experimenting at world building, found the results not good, and so wiped them out and began again; but probably no similar crisis has had so profound an effect upon mankind as that revolution in our notions of the genesis of the living world which we associate pre-eminently with the name of Charles Darwin.

Without doubt the greatest scientific generalization of the last century is the theory of organic evolution. The only other which can be compared

with it, the doctrine of the conservation of energy, has not so profoundly influenced human life nor so greatly changed all the currents of human thought. Evolution has not only transformed biology, psychology, sociology, and anthropology, but it has given a new point of view to all science, art, and even religion. "The great theory of evolution," said John Fiske, "is rapidly causing us to modify our opinions on all subjects whatsoever."

Evolution is only one of many teachings of science which have come into conflict with theology, but because of the fact that supernaturalism made its last and strongest stand on the creation of the living world, and especially of man, it has been for more than a generation the centre of this conflict. Because organic evolution substitutes natural transmutation for supernatural creation, it has been said that it contradicts the biblical account of creation and denies the existence or need of a Creator; because it explains adaptations as the result of natural selection it has been held to destroy the evidences of design in nature; because of its conclusions as to the origin and nature of man it has been accused of debasing man and reducing him to the level of the beasts. Consequently it is not surprising that evolution has been generally regarded as having more important bearings on theology and religion than any other scientific doctrine.

VI

EVOLUTION AND THE BIBLICAL ACCOUNT

It has been asserted that evolution contradicts the biblical account of creation; however it ought not take one long to discover that although the Bible says that God created the heavens and the earth, the herb, the tree, the worm, the fish, the beast, and finally man, it does not describe the exact process by which he made them, and it is this very question of process with which evolution deals. I shall not attempt any subtile reconciliation of geology and Genesis or of evolution and Revelation. I do not believe that the Bible teaches evolution or gravitation or the undulatory theory of light; nor on the other hand do I believe that it contradicts these generalizations of science. The first chapter of Genesis gives, not a literal and scientific account of creation, but a poetic and symbolic account. The simple but majestic language of the creation-story tells to all people of all grades of intelligence that back of the creature there is a Creator. No intelligent person now maintains that it teaches that all things were made in six literal days; we could not if we would maintain that it teaches the exact number and sequence

of geologic ages; why should any one attempt to maintain that it teaches the exact process of creation?

The traditional view of special creation is not founded upon the Mosaic account, as is commonly supposed. There is no evidence to show that the author of that account meant to teach that God created a single pair of each species, as is so often maintained, and that these species have ever since remained perfectly distinct. On the contrary, some of the church fathers, notably St. Augustine and St. Thomas Aquinas, believed in a kind of evolution. The current view that there was a separate creation for each species and that there are "as many species as issued in pairs from the hand of the Creator" did not attain any prominence until the time of the great naturalists, Ray and Linnæus, and its chief literary expression is found not in Genesis, but in the seventh book of Milton's "Paradise Lost." Huxley, therefore, very properly calls it the Miltonic rather than the Mosaic hypothesis. "Theology has taken upon itself the thankless task of defending a long-abandoned scientific theory which is without a particle of biblical, ecclesiastical, or patristic sanction."

Any one who is accustomed to scientific methods of inquiry must have been astonished again and again at the crude ideas or lack of ideas which many persons who believe in the special creation

of man exhibit with regard to the details of that process. Those who are most bitter in their denunciation of the "monkey theory," as they term evolution, are sorely puzzled if required to give some precise idea regarding the process by which they conceive that God created man. The biblical account reads, "And the Lord God formed man of the dust of the ground and breathed into his nostrils the breath of life, and man became a living soul." Here is process and, for aught we know to the contrary, slow and gradual process. More than that, some humble ingredients enter into this human dough, even the dust of the earth. Since the Scriptures plainly speak of a process in the creation of man, the opponents of the theory of evolution ought to be able at least to conceive of a dignified and divine way in which the Creator fashioned man; but, so far as I have observed, this they do not do. The idea that the eternal God took mud or mortar and moulded it with hands or tools into the human form is not only irreverent, it is ridiculous. How much more like the usual workings of that power, by whom and through whom are all things, is the view of evolution that God made the first man as he has made the last, and that his creative power is manifest just as truly and as greatly in the origin of the last child of Adam, as in the origin of Adam himself.

VII

IS EVOLUTION ATHEISTIC?

UNDOUBTEDLY the usual conception of God as Creator and Ruler is that he is a supernatural being, a Great and Good Man in the skies, who created the universe out of nothing, set it going, and watches over it to see that it goes right; that he established natural laws by his word but now and again suspends them in order to accomplish particular purposes or to benefit his worshippers. The scientific conception of nature and of the universality of natural law conflicts with this idea, but it does not deny the existence of that which is symbolized by the word "God." Many scientific generalizations have been condemned as atheistic because they substitute natural processes for supernatural volitions, and chief among these is the theory of evolution.

There has long been a wide-spread misunderstanding in the popular mind regarding evolution. That it is a great scientific question is rarely considered; that it is the only attempt to solve by natural processes the problem of the origin of organisms is wholly disregarded. It is frequently looked upon, not as a law of nature, but as "an invention whereby it is hoped to get rid of a God." Even

Thomas Carlyle could see nothing in it but an atheistic theory, a gospel of dirt: "I have known three generations of Darwin's, atheists all. . . . Ah! it is a sad and terrible thing to see nigh a whole generation of men and women professing to be cultivated, looking around in a purblind fashion and finding no God in this universe. . . . And this is what we have got; all things from frog-spawn; the gospel of dirt the order of the day."

Such a view can arise only from the most fundamental misconception of the doctrine of evolution. It neither affirms nor denies the existence of a God; it deals only with processes and does not profess to touch the question of ultimate causation. It is no more atheistic to believe that individuals and species originally came into existence according to the natural law of development or evolution than it is to believe that individuals now come into the world according to this law. If the evolution of the species is an atheistic doctrine, so is the development of the individual. "Evolution," said Prof. Tyndall, "does not solve nor profess to solve the ultimate mystery of this universe. It leaves, in fact, that mystery untouched." Darwin, himself, held that the theory was quite compatible with the belief in a God; and in one of his last letters, he wrote:* "I have never been an atheist in the sense of denying the existence of God."

* "Life and Letters," vol. I, p. 274.

Evolution is no more diagnostic of a man's views concerning theism than is politics. The custom, therefore, of sharply distinguishing two kinds of evolution, theistic and atheistic, is unfortunate. One might as well speak of theistic and atheistic gravitation. Theists and atheists may accept or reject either theory, but the fact of such acceptance or rejection in no way changes the scientific character of the theory as such, nor does it even remotely touch the evidences for the existence of a God. These evidences stand quite apart from the truth or falsity of evolution.

Science deals only with secondary causes; it never reaches the first cause. It traces effects to causes and these to pre-existing causes and so on until the process must stop, hanging in mid air as it were, without finding the first cause. Infinity lies back of every phenomenon, even the simplest. Observation, experiment, and reason are the organs of science and with these alone it cannot reach "Him whom eye hath not seen nor ear heard." And yet where science ends faith begins, and like the child or the savage, the philosopher or scientist may still say, "In the beginning—God."

If the universe is finite and had a beginning, there must have been a first cause which was itself uncaused. But if the universe is really eternal, nature and natural law are also eternal. Which of these two conceptions is correct can never be

known by finite minds for the problem lies beyond the reach of human knowledge. But either view is consistent with belief in a God. In the former case the Supreme Being, the great First Cause that organized and started the universe and established natural laws is beyond and above nature; he is the "great exception," the one Supernatural Being in all the universe. In the latter case God is in nature, the reason in all natural law, the purpose in all natural processes, the supreme Mind and Will of the universe. Whether animals and plants and the world itself arose by special and sudden creation or are the result of an immensely long process of evolution, infinite power and wisdom are as necessary in the one case as in the other; yes, I think that there is a greater manifestation of the omnipotence, omnipresence, omniscience of an Infinite Being in the process of evolution than in that of creation itself.

Evolution has revived the old controversy as to the government of the universe. Even as in the days of Newton and Laplace, it is claimed by some persons to-day that this theory, like that of gravitation, is but a subterfuge to "drive God out of his universe and put a law in his place." As long as the view is held that God is not present in natural laws the conflict between science and theology must continue. The only satisfactory ground of reconciliation between the two in this matter is to be

found in the doctrine of the divine immanence in all natural phenomena. More and more all kinds of phenomena are being reduced to law. We are beginning to recognize that we do not live in a world of chance or caprice but in one of law, and if God is present only in those phenomena which cannot be reduced to law, he is being speedily and certainly crowded to a narrow and narrower margin. But if he is in all law, then is he in the world as much, yes more than ever; and every blazing autumn hedge is really the burning bush out of whose midst the Omnipresent speaks, every clod is sacred ground, every day is a holy day, and we all live in the constant presence of Deity.

"The sun, the moon, the stars, the seas, the hills, and the plains,—
Are not these, O Soul, the Vision of Him who reigns?

God is law, say the wise, O Soul, and let us rejoice,
For if he thunder by law the thunder is yet his voice."*

The theory of evolution has given men sublimer conceptions of the world and of its Creator than has any rival doctrine. Contrast the old geocentric and anthropocentric views of the universe with the infinitely larger view which science has revealed. Contrast the old view of creation in six literal days with the revelations of science as to the immensity

* Tennyson, "The Higher Pantheism."

and eternity of natural processes. Contrast the old views that all organisms arose suddenly by divine fiat with the view that animals and plants and the world itself are the results of a long process of evolution.

As Darwin so beautifully says: "There is grandeur in this view of life with its several powers having been originally breathed by the Creator into a few forms or into one, and that whilst this planet has gone cycling on according to the first laws of gravity, from so simple a beginning endless forms, most beautiful and most wonderful, have been and are being evolved."*

There is grandeur in this view of man as the climax of all these vast ages of past evolution, as the highest and best product of this eternal process, as the culmination of the lives and experiences of innumerable multitudes of the predecessors of man. There is grandeur in this view of the Creator and of his relation to the world. Consider the eternal patience, wisdom, lawfulness which has through countless ages wrought out our present world; consider the continual process of evolution, the continual presence of the Creator in all natural processes, and then contrast with this the idea of a universe made out of nothing in six literal days by the word of a great Workman, who stands outside his creation and watches it run!

* Darwin, Charles. "The Origin of Species," last paragraph.

Caird* says: "It is impossible for any one who has breathed the spirit of modern science, modern literature, and modern ethics, to believe in a purely objective God; to worship any power of nature or even any individualized outward image, such as those of Apollo or Athene. Still less is he able to worship a *multitude* of such images and so to compensate for the defect of one imperfect form by introducing others to supplement it. His God must be universal, and if he tries to picture him in an outward form, he will soon find it impossible to rest in any one object, and will repeat in his own experience the dialectic by which Polytheism disappeared in the abstract unity of Pantheism. . . . We cannot think of the infinite Being as a will which is external to that which it has made. We cannot indeed think of him as external to anything, least of all to the spiritual beings who, as such, live and move and have their being in him."

God in the form of a Great Man in the skies is both supernatural and unreal. How gross and blasphemous is the crude anthropomorphism which represents God as a "gaseous vertebrate"; how terrible are the oaths of some hundred or more years ago when men swore by the body, blood, bones, teeth, and other organs of God! Contrast with these crude material conceptions God in the form of natural processes:

* Caird, Edward, *loc. cit.*, p. 195.

"Whose dwelling is the light of setting suns,
And the round ocean and the living air,
And the blue sky, and in the mind of man:
A motion and a spirit, that impels,
All thinking things, all objects of all thought,
And rolls through all things."*

God in all truth and beauty and love, in the order and constitution of the universe, in the eternal and immutable laws of nature, in the mind and soul of man! Here is something natural, real, and sublime, something which appeals to the intellect as well as to the emotions, something which inspires awe and reverence, something which influences conduct and shapes character.

"The God who satisfies our conscience," said Charles Kingsley, "ought more or less satisfy our reason also. To teach that was Butler's mission and he fulfilled it well. But it is a mission which has to be refulfilled again and again as human thought changes and human science develops. For if, in any age or country, the God who seems to be revealed by nature seems also different from the God who is revealed by the then popular religion, then that God and the religion which tells of that God will gradually cease to be believed in. For the demands of reason, as none knew better than good Bishop Butler, must be and ought to be satisfied. And therefore, when a popular war

* Wordsworth, "Tintern Abbey."

arises between the reason of any generation and its theology, then it behooves the ministers of religion to inquire, with all humility and godly fear, on whose side lies the fault; whether the theology which they expound is all that it should be or whether the reason of those who impugn it is all that it should be."

VIII

EVOLUTION AND THE DOCTRINE OF DESIGN

EVERYWHERE the universe is a cosmos and not a chaos; "Order is heaven's first law." Order is seen in the whole stellar universe, the solar system, the earth; it is strikingly evident in the phenomena of physics and chemistry; but the order and fitness of nature reach a climax in the living world.

Henderson has called attention to the fact that many remarkable fitnesses or preparations for life are found in the lifeless world. Many of the properties of water, carbon dioxide, and the chemical compounds of carbon, hydrogen, and oxygen are unique and these unique properties are essential to life; without them life could not exist, and they are so numerous that, as Henderson says, "There is not one chance in countless millions of millions that the many unique properties of carbon, hydrogen, and oxygen, and especially of their stable compounds, water and carbonic acid, which chiefly make up the atmosphere of a new planet, should simultaneously occur in the three elements otherwise than through the operation of a natural law which somehow connects them together. There

is no greater probability that these unique properties should be, without due cause, uniquely favorable to the organic mechanism. These are no mere accidents; an explanation is to seek. It must be admitted, however, that no explanation is at hand."*

The one most striking and prominent characteristic of living things is the apparent purpose which is manifested in all their structures and habits. The adaptations of organisms to environment, of means to ends, of structures to habits has ever been and still is the greatest problem of biology. These adaptations of organisms are so precise and wonderful that they seem to imply intelligent design. Indeed it is very difficult to describe them without saying that they exist for this or that "purpose," and if a pure mechanist succeeds in avoiding the use of this particular word by substituting for it some other term, such as "significance" or "use," he cannot wholly avoid the idea of purpose.

It is scarcely possible to speak of any structure or function of an animal or plant that does not illustrate such adaptations. Think of the fitness of various types of limbs for locomotion on land, in water, and in air; of the various kinds of alimentary organs for the digestion and absorption of different sorts of food; of the many contrivances

* Henderson, L. J. "The Fitness of the Environment," p. 276.

for offense and defense, which different organisms possess. Consider the remarkable structures and habits for insuring cross-fertilization in animals and plants and for the protection and nourishment of the young. Think of the fitness of the skeleton for support, of the muscles for contraction, of the heart with its valves for pumping blood, of the nervous system for receiving and transmitting stimuli; think of the fitness of the eye for seeing, of the ear for hearing, of the nose for smelling; think of the fitness of every organ for its particular use, and then consider the peculiar fitness with which all these organs and all their innumerable parts are co-ordinated into one harmonious whole. Viewed in this light "what a piece of work is a man," or any other organism!

Or consider the wonderful adaptations to be seen in the reactions and tropisms of the simplest organisms; in the instincts and habits of higher animals; in the development of intelligence and reason in man. Even one-celled animals and plants seem to be guided by intelligence though we know that this is not really true; however in general they avoid injurious environments and find beneficial ones, and they have solved their problems of nutrition, reproduction, and defense almost as perfectly as have the highest animals. The instincts of the different members of a colony of ants or bees are very complex and very different, and yet

all are wonderfully well adapted to the preservation and prosperity of the colony. The migratory habits of fishes and birds are even more remarkable; the value of these habits is easily seen, but what series of natural causes can explain their origin? Finally, consider that the marvellous instincts, intelligence, and psychic capacity of man have developed out of the apparently simple reactions of a germ cell and that this whole process of development has been so co-ordinated and every step has been so well adapted and directed that it leads to consciousness and reason and purpose!

How can all these marvellous fitnesses of the living world and its environment be explained? The unhesitating answer of the naïve person is that each and every one of them must have been designed in detail by an intelligent and supernatural Designer. And yet when studied in detail it is evident that each adaptation is a natural rather than a supernatural phenomenon, though it is by no means certain that in the last analysis it is the result of chance or pure mechanism. Some of the world's great philosophers and scientists, from Aristotle and Plato to Kant, Schopenhauer, Lamarck, Cope, Bergson, Driesch, and Henderson, have maintained that the fitness and order of nature can be explained only by assuming that there is some sort of teleological principle in nature, which lies back of or runs parallel with the principle of

causality—something which acts more or less like human will or purpose, and which is itself an uncaused cause lying outside the field of scientific inquiry.

Kant has expressed this opinion in a well-known passage: "It is quite certain that we cannot become sufficiently acquainted with organized creatures and their hidden potentialities by aid of purely mechanical natural principles, much less can we explain them: and this is so certain that we may boldly assert that it is absurd for man even to conceive such an idea, or to hope that a Newton may one day arise to make even the production of a blade of grass comprehensible, according to natural laws ordained by no intention."

Haeckel and other pure mechanists have hailed Darwin as Kant's impossible Newton of the living world and his theory of "natural selection" as the purely mechanical principle which accounts for the adaptations of organisms. Darwin proved in masterly manner that overpopulation leads to a struggle for existence, and in this struggle the unfit are eliminated and the fit are favored. In this way many of the remarkable adaptations of the living world can be causally explained, and if this principle of the elimination of the unfit is extended from whole organisms to parts of organisms, germinal units, and even to the reactions of individual organisms, it is possible that all kinds of adapta-

tions may be thus explained. The origin of fitness rather than the "origin of species" is the greatest problem in the world of life and it is the crowning glory of Darwin's theory that it offers a mechanistic solution of this eternal problem of life and evolution.

If this be true, does it not finally dispose of teleology in nature? I think not, although it undoubtedly modifies that doctrine and substitutes natural causes for supernatural ones. In the light of Darwin's theory we see that adaptations are the results of natural causes; the causal mechanism applies to all the fitnesses of nature as well as to other phenomena; but back of all mechanism, or running through all mechanism, is teleology or purpose.

From the standpoint of science and philosophy the origin of this order and mechanism is the great secret of the universe. Science deals only with mechanisms and a purely scientific explanation must be mechanistic, but there is no mechanical explanation for the ultimate mechanism of the universe; mechanism cannot explain itself. The mechanism of a locomotive will explain what it does, but it will not explain its origin nor the purpose which it subserves. The organization of an animal or plant or egg is said to explain what it does but it will not explain the teleological nature of that organization.

Biologists no longer think of any adaptation as

having been directly created for the purpose which it now serves but rather as having been slowly developed in the course of evolution. Nevertheless in tracing an adaptation to its sources we do no more than transfer the origin of fitness to earlier causes. We may explain the fitness of the eye as due to its ontogenetic development, and this as due to heredity and environment, but this does not explain how the potentialities of the eye came to be in the germplasm. We have merely shifted the problem to an earlier stage. And the same is true of the evolution of eyes; our explanation of the origin of eyes may be that they are due to mutation and natural selection, or to the inherited effects of use and disuse, but in either case we do not explain the fact that eyes were potentially present in these causes. We have merely shifted the problem from the fitness of results to the fitness of the causes of those results; and in spite of Darwin and his great theory it is still true that no Newton has yet arisen "to make even the production of a blade of grass comprehensible, according to natural laws ordained by no intention."

Most of all when we consider the whole course of evolution from amœba to man, from the simplest motor responses to the development of intelligence and reason capable of studying the universe and its origin, are we impressed with the thought that evolution must have been guided by something

other than chance. If progressive evolution is increasing complexity of organization and increasing adaptation to the environment, it is surely no accident that organization and environment have been so correlated that they have led to the perfection of adaptation which we see all about us. Evolution has not been an eternal see-saw; it has led somewhere. The fact that organisms can adapt themselves to changing environment is no accident; the fact that environment has so changed as to bring about progress is no accident. Philosophically it is impossible to escape the conclusion that evolution has revealed a larger teleology than was ever dreamed of before—a teleology which takes in not only the living but also the lifeless world.

Given water, carbon dioxide, and the carbon compounds with the unique properties to which Henderson has called attention, and it is conceivable that life could have arisen through the operation of natural laws; and again when once life and its mechanisms are given the living world could have evolved through the operation of natural laws. In the transformations of germplasm and of inheritance units we probably have the mechanism of evolution, and in the survival of the fit and the elimination of the unfit we probably have the mechanism of adaptation. But the great problem and mystery which lies back of all this mechanism is how the environment favorable to life came to

have these unique properties, how it happened that all the multitudes of co-operating factors necessary to the origin of life came together in the right way and at the right time, how primitive protoplasm came to contain the potencies of all future evolution, and how it happens that the environment was such as to bring out these potencies in the long course of evolution.

These are not scientific problems, for they are probably beyond the reach of science and exact knowledge, but not beyond the reach of philosophy and religion. The philosophical mind refuses to believe that purpose in human behavior and fitness in nature are merely the result of chance, even of many chances. As well might one try to explain the play of Hamlet as due to an explosion, or a series of explosions in a printing office. Many of the most profound students of nature from Aristotle to modern evolutionists have found it necessary to assume the existence of some initial teleological principle. Weismann held tenaciously to a mechanistic conception of nature, but he also held that extreme mechanism was consistent with extreme teleology; indeed he maintained that "The most complete mechanism conceivable is likewise the most complete teleology conceivable. With this conception vanish all apprehensions that the new views of evolution would cause man to lose the best that he possesses—morality and purely

human culture." And no less a mechanist than Huxley said, "Perhaps the most remarkable service to the philosophy of biology rendered by Mr. Darwin is the reconciliation of teleology and morphology, and the explanation of the facts of both which his views offer. The teleology which supposes that the eye, such as we see it in man or one of the higher vertebrata, was made with the precise structure which it exhibits, for the purpose of enabling the animal which possesses it to see, has undoubtedly received its death-blow. Nevertheless it is necessary to remember that there is a wider teleology, which is not touched by the doctrine of evolution, but is actually based upon the fundamental proposition of evolution." And Darwin himself confesses "the extreme difficulty or rather impossibility of conceiving this immense and wonderful universe, including man with his capacity of looking far backward and far into futurity, as the result of blind chance or necessity. When thus reflecting," he continues, "I feel compelled to look to a First Cause having an intelligent mind in some degree analogous to that of man; and I deserve to be called a Theist. This conclusion was strong in my mind about the time, as far as I can remember, when I wrote the 'Origin of Species'; and it is since that time that it has very gradually, with many fluctuations, become weaker. But then arises the doubt, can the mind of man, which has,

as I fully believe, been developed from a mind as low as that possessed by the lowest animal, be trusted when it draws such grand conclusions?" *

The probabilities are almost infinity to one against the conclusion that the order of nature, the fitness of the environment for life, and the course of progressive evolution with all of its marvellous adaptations are all the results of blind chance. The scientist and philosopher may explain this order and harmony by a mysterious and inexplicable teleological principle, but the convinced theist will regard it as design. Thus upon this topic, Asa Gray, the well-known botanist, said: "The wiser and stronger ground to take is that the derivative hypothesis leaves the argument for design, and therefore for a Designer, as valid as it ever was; that to do any work by instruments must require, and therefore presuppose, the exertion rather of more than of less power than to do it directly; that whoever would be a consistent theist should believe that Design in the natural world is co-extensive with Providence, and hold as firmly to the one as he does to the other."

On the other hand the more cautious scientific attitude is well expressed by Henderson in the following thoughtful sentences: "We may progressively lay bare the order of nature and define it with the aid of the exact sciences. Thus we may

* "Life and Letters," vol. I, p. 282.

recognize it for what it is, and now at length we clearly see that it is teleological. But we shall never find the explanation of the riddle, for it concerns the origin of things. Upon this subject clear ideas and close reasoning are no longer possible, for thought has arrived at one of its natural frontiers. Nothing more remains but to admit that the riddle surpasses us and to conclude that the contrast of mechanism with teleology is the very foundation of the order of nature, which must ever be regarded from two complementary points of view, as a vast assemblage of changing systems, and as an harmonious unity of changeless laws and qualities working together in the process of evolution." * In short, science reveals to us a universe of ends as well as of means, of teleology as well as of mechanism, and in this it agrees with the teachings of philosophy and religion.

* "The Order of Nature," pp. 208–209.

IX

THE NATURE OF MAN

THE theory of evolution presumes to determine man's place in nature and to many it seems that it degrades man and reduces him to the level of the beasts. That man is an animal, however, no one who has given the matter any consideration, can for a moment doubt. The entire structure, development, and functions of man's body unmistakably proclaim that he is related to the animals. He is born, nourished, and reproduced, he is subject to the laws of nature, to disease and death as is the humblest animal or plant. Every bone, muscle, and nerve of the human body is found in almost exactly the same position and shape in the higher mammals. As Romanes says, "Here we have a fact, or rather a hundred thousand facts, which cannot be attributed to chance, and if we reject the natural explanation of hereditary descent from a common ancestry we can only suppose that the Deity in creating man took the most scrupulous pains to make him in the image of the beasts." According to his physical structure man must be classified as an animal, a vertebrate, a mammal, and finally a primate, to which order the monkeys

belong. And yet there are emotionalists who deny this animal classification. John Fiske tells of a man who became very indignant when told that he was a mammal and exclaimed: "I am not a mammal, nor the son of a mammal." He adds that he had probably been brought up on a bottle.

Many persons can see in such animal ancestry only the loss of dignity and the degradation of man, and I freely admit that as sometimes expounded by evolutionists this opinion is justified. If man is the result of unintelligent forces and processes; if as one biologist has said, "The evolution of consciousness is the greatest blunder in the universe"; if men are born by millions only to be swept away by flood, fire, famine, pestilence, and war; if they live and die like the beasts and leave only their bones and implements behind; if suffering and struggle are purposeless and lead to nothing—if this really were the teaching of evolution then certainly it would be true that evolution debases man and destroys the hopes of mankind. But this is not true and it is not the teaching of evolution but rather of pessimism and atheism.

The blighting influence of atheism is shown in just such conclusions as those mentioned, for it substitutes blind chance and necessity for plan and purpose, both in nature and in human life. If there is no teleology in nature, the course of evolution leading to man and to consciousness is the

result of blind and blundering accident. If there is no purpose or value in human labor and suffering, life is not worth living. But there are evidences of teleology in nature and of purpose in human life. Even struggle and suffering and death have their value if in the long course of evolution they lead to progress. Men do not die and leave only their bones and implements, but "they rest from their labors and their *works* do follow them." "Others have labored and we have entered into their labors." Civilization is what it is to-day because of the labor and influence of millions of persons, most of whom are wholly unknown to us. Only a few men have achieved immortal fame, but multitudes have contributed to human progress.

Granting that there is teleology in nature, progress in evolution, and purpose in human life, it does not really matter from the standpoint of religion whether the universe and man came into existence by evolution or by creation. I cannot see that it is any more degrading to hold that man was made through a long line of animal ancestry, which ultimately came from the dust, than to believe that man was made directly from the dust. Surely the horse and the dog and the monkey belong to higher orders of existence than do the clod and the stone. Whether we accept the teaching of evolution or the most literal interpretation of the biblical account we are compelled to recognize the fact that our

bodily origin has been a humble one; as Sir Charles Lyell once said, "It is mud or monkey." Nature, revelation, and human history love to proclaim the fact that lowliness of origin is not inconsistent with the highest ideals of perfection. "They that deny a God destroy man's nobility," said Bacon; "for surely man is of kin to the beasts by his body; and if he be not of kin to God by his spirit, he is an ignoble creature."

To those whose only thought of the animal creation is one of contempt and disgust, the suggestion of man's animal ancestry must come as a cruel shock. But those whose eyes are opened to the beauty and innocence, the joys and sufferings, the strength and weakness, the intelligence and affection of living things; those who believe with Coleridge that

> "He prayeth best who loveth best
> All things both great and small,
> For the dear God who loveth us,
> He made and loveth all";

—those whose lives are simple and who are not puffed up with a foolish pride as to their own dignity will neither be ashamed nor afraid to follow the example of St. Francis of Assisi who called the birds his brothers and thought that they praised God in the forest as the angels do in heaven.

But if man is the brother of the animals, he is

also akin to the Infinite. The glory of the brute is physical, the glory of man is intellectual, social, spiritual. The perfection reached by the brute is strength, cunning, at best moral innocence; the perfection reached by man is intelligence, reason, freedom, faith, hope, love—in short, noble character. The psychical elements which in animals are "cabined, cribbed, confined" reach in man their fullest expansion. The intellect, the emotions, the will, love, mercy, justice, responsibility, philanthropy, conscience, the search after and worship of the true, the beautiful, the good, the Infinite—these proclaim man a spiritual being. Evolution teaches the animal ancestry of man, but in spite of this it does not degrade him, for it teaches that he is the consummation of this stupendous process. "The dignity of man is not due to the fact that recently and miraculously he was launched into the world; the real dignity of man consists not in his origin, but in what he is and what he may become."

Evolution unquestionably denies that the primitive condition of mankind was one of perfection as measured by our present standards. In this regard it is in entire accord with the conclusions of history and archæology. There is every evidence that human history has been a development from a simpler to a more complex state; in short an evolution. As to the culture of the prehistoric period there can be no question that it was in every way

simpler and more primitive than that of the historic era, as is demonstrated by prehistoric remains and indirectly proven by a study of races at present in the prehistoric condition.

This primitive condition of the race could scarcely be called a state of perfection. According to the biblical account Adam and Eve were naked, houseless, uncultured; in body fully developed, in mind and soul children. That they were innocent as children are, has been interpreted by many to mean that they were perfect, not only physically and morally but also intellectually. Lyman Abbott says that he once heard a preacher say in one of his sermons that Adam and Eve undoubtedly knew all about the telephone. There are probably few even among literalists who would go that far to-day.

As a result of this animal ancestry many animal instincts survive in man which conflict with his higher intellectual and social life. In this way there comes to be that lack of inner harmony and social fitness to which all religions and all systems of ethics have directed attention. This is the main source of the conflict between emotionalism and rationalism, between the individual and society. So far as I can judge, animals, even the highest, are not troubled by a sense of sin, repentance, or responsibility. On the other hand, mankind as a whole is characterized by the possession of such

a sense. Between animals and men there is this great difference. If man came from the animals he also must have come from an irresponsible and hence an innocent condition. Before any "fall" from this condition was possible there must have been the step upward to responsibility and moral consciousness. So far as we know the highest animals have only the most rudimentary moral ideals. Only in him in whose soul are lofty ideals can there be any adequate consciousness of a fall. A man whose ideals were wholly brutish would have no condemnation in living the life of a brute. But he who has awakened to the fact that he is a social and moral being, who knows the better and does the worse, he has fallen from the higher to the lower. Until reason and the moral sense are developed in man there can be no fall; there is nothing to fall from. When these are developed there arises a conflict between the old habits of unreason, irresponsibility, and sensuous pleasure and the new ideals of reason, responsibility, and duty; when in this conflict the former overcome the latter there is a moral fall. In this sense the "fall of man" is no unique historical event; it is a part of the personal experience of all men.

X

THE RELIGION OF EVOLUTION

FRANCIS GALTON closes his book on "Inquiries into Human Faculties" with these words: "The chief result of these inquiries has been to elicit the religious significance of the doctrine of evolution. It suggests an alteration in our mental attitude and imposes a new moral duty. The new mental attitude is one of a greater sense of moral freedom, responsibility, and opportunity; the new duty which is supposed to be exercised concurrently with, and not in opposition to, the old ones upon which the social fabric depends, is an endeavor to further evolution, especially that of the human race."

A. PROGRESS THROUGH STRUGGLE

The religion of evolution is a religion of progress through struggle and effort. It is neither pessimism nor optimism, but realism. It recognizes the existence of unfitness, disharmony, and evil, but interprets these as challenges to their alleviation. The powers of nature which were feared and dreaded by our savage ancestors have been harnessed for the service of man. Great catastrophes in which hundreds of lives are lost in fires and floods and

wrecks teach a lesson which even ignorance can appreciate, namely that some way must be found to avoid these things in the future. Disease, suffering, and death are challenges to man of the most insistent and persistent sort to find out their causes and to eliminate or control them. Millions of human beings suffered and died from tuberculosis, plague, cholera, typhoid, yellow fever, malaria, syphilis, cancer, and other diseases before remedies for some of these were found, and millions more will suffer and die before they are eliminated—but does any far-seeing person doubt that this will ultimately be achieved? Injustice and crime, ignorance and superstition are not useless if they lead society to seek out their causes and to eliminate them. Even the horrors of war teach a lesson which the world is slowly learning and, if mankind can learn by experience, the time will come when war shall be no more. And as to the inner conflict between emotion and reason, selfishness and altruism, evil and good, we know from experience that progress can be made only by effort; that inner peace does not come from satiety but from successful struggle;

> "That men may rise on stepping stones
> Of their dead selves to higher things."

The religion of evolution holds forth no hope of a perfect millennium in which all evil shall be eliminated and all struggle shall cease. On the con-

trary it teaches that not only progress but even continued existence depends upon struggle against adverse conditions. There can be no progress of any kind without struggle; in physical evolution progress has depended upon the struggle for existence; in intellectual evolution upon the struggle for freedom and enlightenment; in social evolution upon the struggle of ethical ideals and instincts against antisocial ones. Passively waiting for evolution to carry us to the skies will be of no avail. Progress is no necessary part of evolution and in general it is easier to go backward than forward. The further evolution of man must depend upon the struggle and success of rational efforts and ideals. We must seek through eugenics and euthenics to improve the bodies of men; through education, the minds of men; through religion the morals of men. We must struggle against disease and physical defects, against effeminacy, luxury, and indolence, and against the retrogressive selection of civilization; we must struggle against ignorance, illiteracy, and superstition; against bigotry, selfishness, brutality, and hate. The struggle against evil in general is thus a condition of social progress, as the struggle for existence against adverse conditions is a factor in physical progress.

Evolution thus offers a rational solution of the great problem of evil. It has taught us that there is all about us a great and world-wide struggle for

existence; that inaction and satiety end in degeneration and that advance can be purchased only by struggle, suffering, and death. The apparent malevolence of nature finds in evolution a beneficent explanation. Measured by its results who will say that the outcome of evolution is not worth all that it has cost? Purposeless struggle and suffering would be evidence of malevolence; but evolution has shown that struggle, suffering, and death when viewed from the standpoint of nature as a whole are not purposeless, but rather that these things are factors in a great world movement, in an infinite process of evolution in which the "whole creation groaneth and travaileth in pain . . . waiting for the manifestation of the sons of God." The religion of evolution is thus at one with the religion of revelation.

B. Ethnocentric rather than Egocentric

A religion that looks merely to personal rewards or punishments in the present or future is not one of the highest type; on the other hand the religion of service and sacrifice for the good of others, the religion of which Christ was the great exemplar, must more and more become the religion of human society in future stages of evolution.

In the past religion has dealt to a large extent with the individual and his relation to God; its chief concern was the salvation of individual souls

and their preparation for a future life; it has been largely *egocentric*. The religion of the future must more and more deal with the salvation of society; it must be *ethnocentric*. Evolution has taught us the superlative importance of the race or species. Among all organisms the one lives for the many, the individual reproduces and labors and dies for the race. In man no less than in lower organisms the welfare and evolution of the species is of supreme concern. And the greatest and most practical work of religion is to further the evolution of a better race. This religion looks forward not only to better individuals as its ultimate goal, but also to a better association of individuals; to a rational organization of society in which social specialization and co-operation will be greatly increased, in which poverty and disease will be greatly decreased, in which heredity, environment, and education will be greatly improved.

At times it seems that selfishness and intolerance are on the increase, that all social progress has stopped and that degeneration and disintegration have set in. At present we are witnessing an outbreak of license and anarchy on one side and of reaction and intolerance on the other. At such times it is especially necessary to take the long view of human evolution, to remember from what society has developed, and to realize that in the course of social evolution selfishness, bigotry, and anarchy

are eliminated as foul water is purified in flowing down stream. The antisocial, the selfish, and the unscrupulous find that as their hand is against every man so is every man's hand against them. This is the law of reciprocity. All normal men are "Dowered with the hate of hate, the scorn of scorn, the love of love." Service is not only the law of society, it alone is the way of success. The ethnocentric religion of evolution merely supplements and enforces the ethical teachings of the most advanced religions; in all of them the goal is the same, namely *service.*

If it be true that the fittest physically is the most viable, the fittest intellectually the most rational, the fittest socially the most ethical, then it follows that in the long run natural selection will operate against the less viable, the less rational, and the less ethical. There is "a power not ourselves that makes for righteousness," for reasonableness, and for fitness. As the stars in their courses fought against Sisera, so the nature of things makes for progress.

Can this religion of science and evolution be incorporated in the organized religions of the civilized world? Can religion in general keep pace with the intellectual and social advance of mankind? Can it rid itself of its useless inheritances from a savage past; can it throw off the relics of fetichism, emotionalism, and superstition; can it

be saved from irrationalism, literalism, and formalism? Can Christianity become the religion of reason and science as well as of emotion and faith and be made the power for individual and social progress which its founder intended?

Certainly progress in this direction has been slow, and at times it seems as if religious evolution had come to an end. Thousands of thoughtful and reverent men have left the churches and renounced the creeds, the literal interpretation of which they could no longer support, and other thousands have been prevented from doing this only by the hope that churches and creeds might be reformed from within. We must recognize the fact that complete uniformity of belief can never be attained in religion any more than in politics or anything else. Various churches and faiths must always exist for various types of human beings. It is often said that existing forms of religion with their literalism and formalism are well adapted to the mass of mankind. This is probably true; most men are not greatly interested in an intellectual or philosophical type of religion, but all men are interested in higher ideals of conduct and duty. In all progress religion should lead rather than lag behind, and at least its intellectual requirements need not be so primitive as to drive out those of more advanced intelligence.

How extraordinary it is that nineteen centuries

after the life and labors of the greatest religious teacher and social reformer in the history of mankind, and after the spread of his teachings over all the earth, there should still be left a considerable body of his so-called followers who identify religion with the literalism and formalism which he condemned and whose test of righteousness is intellectual assent to a formal creed rather than dedication to a life of service! But to-day we are in the midst of a religious revolution, which is going on so quietly that many do not notice it, although it is a greater and more fundamental revolution than any since the early years of the Christian era. We are witnessing great changes in the attitude of the churches on questions of faith and science. The spirit of science has entered into religion. This spirit demands not uniformity of belief but uniformity of aim, not absolute and perfect truth but the best available truth, not authority but evidence, not words but works; and more and more religion is demanding these things. The time may come sooner than some of us expect when in all things except spirit and purpose religion may once more be a personal matter; when churches will welcome all "men of good-will"; when love of God and love of fellow men will be the one requirement for mutual fellowship and service. When that time comes religion and science will be at one.

C. The Outcome of Evolution

Speculations as to the meaning and outcome of evolution have no place in science but they do occupy a prominent and legitimate place in every mind. We are creatures of a day; we catch glimpses of great world processes which come out of eternity and go into eternity and it would be presumptuous to suppose that we could wholly comprehend these processes or forecast their outcome. And yet as we may reason from the present to the past, so we may justly, though perhaps imperfectly, reason from present and past to the future.

The past course of evolution together with the evidences for teleology in nature are strong arguments for a plan or purpose in evolution, the ultimate unfolding of which is probably beyond our power to conceive. This purpose is, at least in part, already indicated. Man is the highest product of evolution. There is good reason to believe that no higher animal will ever appear upon the earth. Although the limits of individual evolution may have been reached, at least for the present, there is good evidence that we have barely begun to realize the possibilities of social evolution. To a large extent mankind holds the power of controlling its destiny on this planet. Evolution through all the ages has been leading to a higher intellectual, ethical, and spiritual life. There is no reason to

believe that it will change its course to-morrow. But as in former ages progress passed from individual cells to many-celled organisms, so now it is passing from individual organisms to society. While we cannot see the goal we can see our present duty.

The religion of evolution deals with this world rather than with the next. It prays "Thy kingdom come, thy will be done on *earth*." It seeks to build here and now "The City of God." It looks forward to a time when "Righteousness shall cover the earth as the waters cover the sea." It looks forward to unnumbered ages of human progress upon the earth, to ages of better social organization, of increasing specialization and co-operation among individuals and races and nations, to ages of greater justice and peace and altruism. Indeed the religion of evolution is nothing new, but is the old religion of the world's greatest leaders and teachers, the religion of Confucius and Plato and Moses and especially of Christ which strives to develop a better and nobler human race and to establish the kingdom of God on the earth.

To us it is given to co-operate in this greatest work of all time and to have a part in the triumphs of future ages, not merely by improving the conditions of individual life and development and education, but much more by improving the ideals of society and by breeding a better race of men

who will "Mould things nearer to the heart's desire."

The inspiring visions of prophets and seers concerning a new heaven, a new earth, and a new humanity find confirmation and not destruction in human evolution viewed in retrospect and in prospect, for the past and present tendencies of evolution justify the highest hopes for the future and inspire faith in the final culmination of this great law in

"—one far-off divine event,
To which the whole creation moves."